

## 4.15 TRANSPORTATION and PARKING

### 4.15.1 Impacts of the No Action Alternative

The transportation and parking analysis for the No Action Alternative was conducted for AM and PM peak hour conditions in 2012, consistent with the potential build-out year of the Proposed Master Plan. The No Action Alternative provides a baseline for comparison to the development alternatives, by which transportation and parking impacts can be measured and mitigation measured defined, as warranted.

#### ***Planned Improvements***

The following planned roadway, transit, and non-motorized improvements provides an overview of what the transportation system would look and feel like to motorists, pedestrians, and bicyclists by 2012.

#### **Roadway Improvements**

The King County *Transportation Needs Report 2001-2021* was reviewed to identify transportation improvement projects planned for the study area. The report lists improvement projects for which King County has identified a need in the next 20 years in order to implement the adopted comprehensive plan and prioritize transportation needs and supply. The King County *Capital Improvements Program 2003-2008* was also reviewed. There are no specific improvement projects currently listed within King County's *Capital Improvement Program* for the study area. There are two specific improvements listed for future implementation in King County's *Transportation Needs Report 2001-2020*:

- **4<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street Traffic Signal (H-39).** This project would install a traffic signal at the intersection of 4<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street. The intersection lies on the southeast corner of the project site and currently operates as an all-way stop control intersection. No construction or completion date is listed for the project, but the project is rated as a 'high' priority within King County's *Transportation Needs Report*.
- **15<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street Traffic Signal (H-14).** This project would install a traffic signal at the intersection of 15<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street. This intersection lies to the southwest of the project site. This project is rated as a 'high' priority by King County.

The City of Seattle's *Six-Year 2002–2007 Capital Improvement Program (CIP)* was also reviewed. The *CIP* lists improvement projects that have been approved by the City of Seattle and have identified funding sources within the next six years. There are no specific improvements listed for implementation within the study area.

#### **Transit and Rail Improvements**

Metro plans to reduce the headways on many transit routes in the West Seattle area by 2007. In particular, Metro intends to reduce headways from White Center, West Seattle, and Southcenter to 15 minutes. In addition, Metro identifies general improvements in the area consisting of locating additional on-street curb space to provide increased capacity to

accommodate increased service on routes terminating in White Center. These plans are discussed in *King County Metro Six-Year Transit Development Plan (2002-2007)*.

As discussed in their *2002 Service Implementation Plan*, Sound Transit has plans to expand Route 570 service to operate on weekends as well as weekdays. Service would be provided on 60-minute headways during the weekend hours and 30-minute headways during the weekday mid-day and evening hours. Sound Transit Route 570 currently operates between Downtown Seattle and SeaTac airport, via West Seattle, White Center, and Burien.

The Elevated Transportation Company (ETC) is currently preparing an environmental impact statement for future expansion of the monorail system. One of the proposed expansion areas for the monorail is the West Seattle community. The monorail would provide connection to downtown Seattle. Transit connections between White Center and monorail stops in West Seattle are likely, increasing the modes of public transit available for travel within the region.

### **Non-Motorized Improvements**

King County's *Transportation Needs Report 2001-2020* identifies three projects specifically related to improving non-motorized transportation conditions in the immediate study area. These projects are listed below.

- **8th Avenue SW Street and Pedestrian Improvements (H-251).** This project would construct curb, gutter, and sidewalk on 8<sup>th</sup> Avenue SW, between SW 108<sup>th</sup> Street and SW Roxbury Street. No construction or completion date is listed for the project, but the project is rated as a 'high' priority within King County's *Transportation Needs Report*.
- **SW 102nd Street Improvements (H-247).** This project would construct curb, gutter, and sidewalk on SW 102<sup>nd</sup> Street, between 11<sup>th</sup> Avenue SW and 17<sup>th</sup> Avenue SW. Again, no construction or completion date is given, but the project is listed as 'high' in priority by King County.
- **15<sup>th</sup> Avenue SW-16<sup>th</sup> Avenue SW Safety Improvements (H-290).** This project would complete a pedestrian/bike access/safety improvement study for both 15<sup>th</sup> Avenue SW and 16<sup>th</sup> Avenue SW, between SW 112<sup>th</sup> Street and SW Roxbury Street. The project is rated 'medium' in priority by King County.

The City of Seattle's *Six-Year CIP* identifies no new improvements to non-motorized facilities within the vicinity of the proposed project site.

### **Traffic Volumes**

2012 peak hour traffic volumes for the No Action Alternative are comprised of two elements: existing traffic, and background traffic growth that encompasses general traffic growth and future developments which could possibly occur within the area by 2012.

### **Existing Traffic**

Existing 2002 traffic counts were collected as described in the Affected Environment section of this Draft EIS (see *Section 3.15*), and were used as the foundation from which future 2012 traffic volumes were derived.

### **Background Growth and Pipeline Projects**

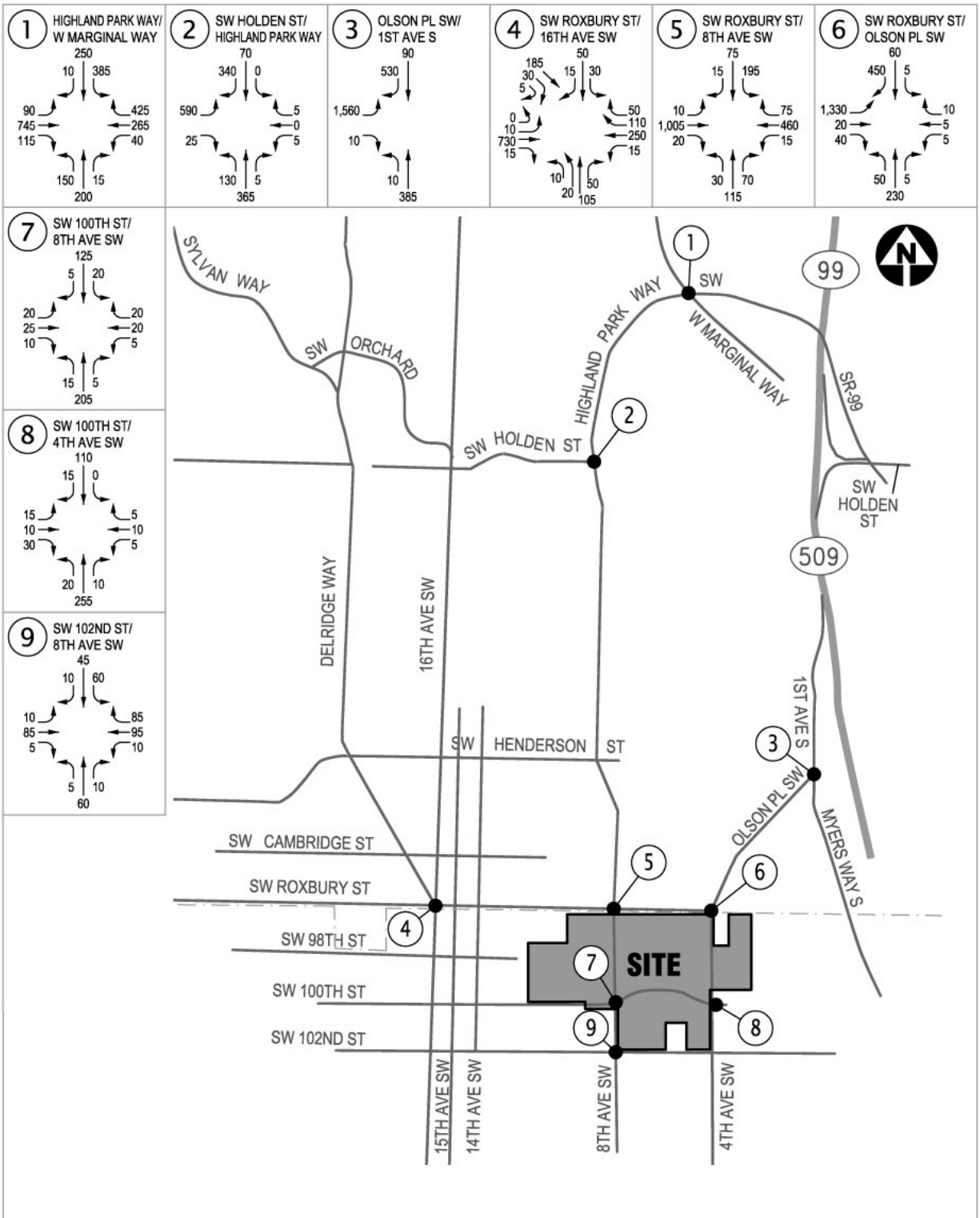
For purposes of developing a worst-case scenario of future traffic volumes in the area, traffic volumes for the No Action Alternative were estimated by increasing existing volumes by an annual growth rate. Based on historic traffic counts from the past decade available from the City of Seattle and King County, an annual growth rate of one-percent was applied to all study area intersections, which is consistent with the historic counts for AM and PM peak hours, and daily traffic growth. This growth rate may represent a conservative (i.e., worst case) estimate, as some locations have experienced decreased traffic growth in recent years.

The inclusion of 'pipeline projects' in future year analysis was considered. Neither the City of Seattle nor the City of Burien identified projects in the area that their staffs felt would warrant including in the LOS analysis. Current King County pipeline projects were requested for the Highline Planning Area and were sorted and evaluated based on the location of the planned project, type of use, and likely impact at study intersections. After this evaluation, it was concluded that King County pipeline projects did not constitute a collective impact necessitating inclusion as pipeline projects. Therefore, all future pipeline project growth has been assumed to be within the one-percent annual growth rate applied to study intersections. Due to the nature of the surrounding area and past development practices, there are not a high number of planned development projects currently planned in the area, nor are such projects expected between now and 2012.

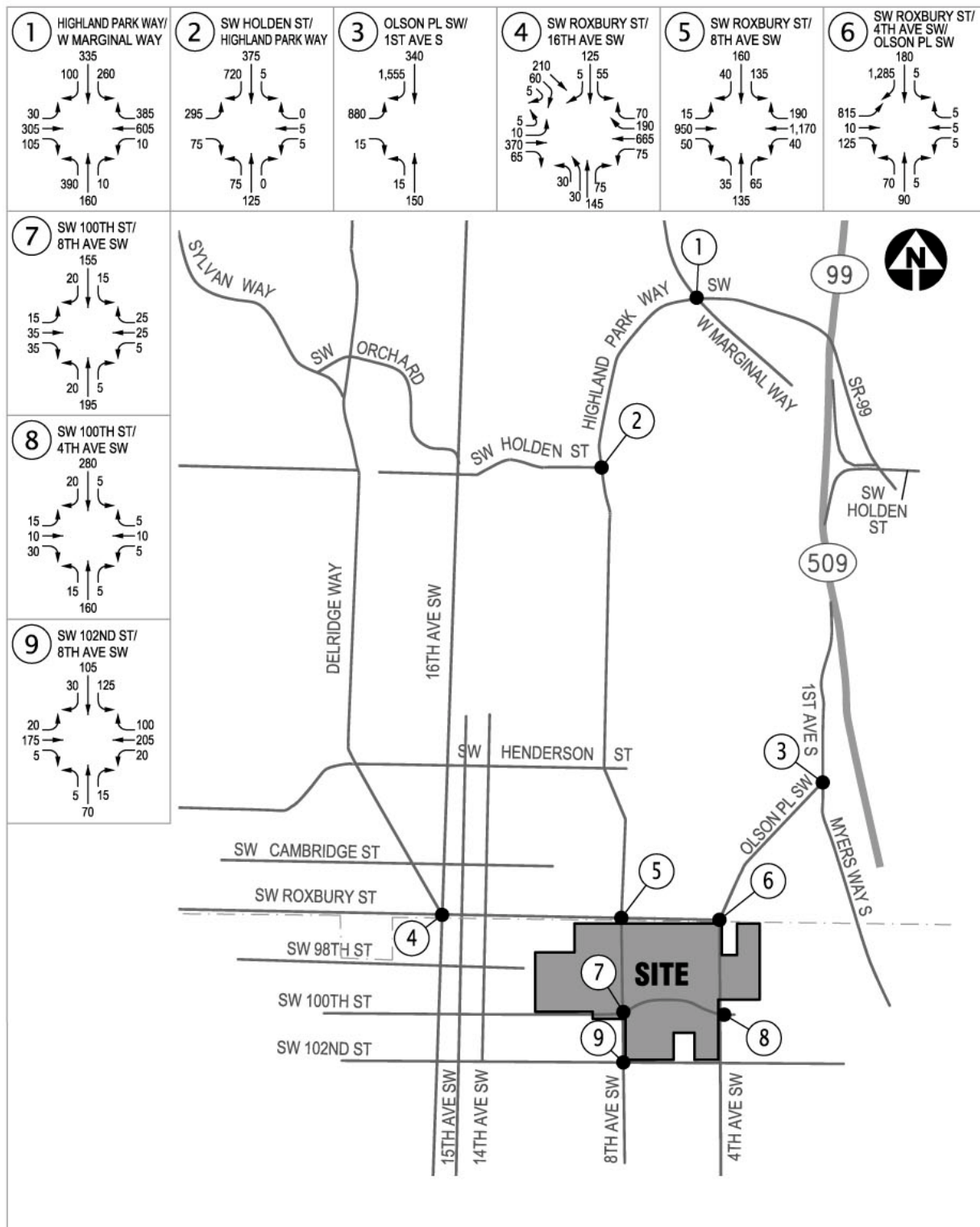
Existing volumes were grown by one-percent per year and would result in the estimated traffic volumes for the No Action Alternative. **Figures 4.15-1** and **4.15-2** illustrate future (2012) AM and PM peak hour traffic volumes at study intersections, respectively.

### ***Traffic Operations***

Weekday peak hour intersection levels of service were calculated for each of the study intersections. Since no specific planned transportation improvement projects were identified, no improvements were assumed in the No Action Alternative analysis. The signal timings (cycle length/phase splits) at the signalized study intersections were "optimized" in the No Action Alternative analysis due to the horizon year being far in the future. It is assumed that, by 2012, some degree of modifications would occur at these traffic signals. Thus, optimization is intended to present the clearest picture of likely traffic operation conditions in the future. For comparison purposes, **Table 4.15-1** illustrates AM and PM peak hour levels of service, average delays, and v/c ratios for both existing conditions and the No Action Alternative.



Source: The Transpo Group



Source: The Transpo Group

Table 4.15-1  
PEAK HOUR LOS SUMMARY  
EXISTING AND 2012 NO ACTION ALTERNATIVE

Signalized Intersections <sup>1</sup>	AM Peak Hour						PM Peak Hour					
	Existing			No Action (2012)			Existing			No Action (2012)		
	LOS <sup>2</sup>	Del <sup>3</sup>	V/C <sup>4</sup>	LOS	Del	V/C	LOS	Del	V/C	LOS	Del	V/C
16 <sup>th</sup> Ave SW/SW Roxbury St	C	21.9	0.50	C	23.8	0.59	C	24.1	0.67	C	29.3	0.78
8 <sup>th</sup> Ave SW/SW Roxbury St	C	23.7	0.61	B	16.3	0.69	B	16.8	0.68	B	15.2	0.77
Olson PI SW/SW Roxbury St	B	14.9	0.66	B	16.5	0.71	B	11.5	0.42	B	11.7	0.47
1 <sup>st</sup> Ave S/Olson PI SW	A	9.9	0.61	B	11.3	0.66	D	40.8	1.00	E	63.6	1.06
Highland Park Wy SW/W Marginal Way SW	C	31.8	0.69	D	37.9	0.79	C	32.3	0.77	D	35.9	0.89
Unsignalized Intersections	LOS	Del	WM <sup>6</sup>	LOS	Del	WM	LOS	Del	WM	LOS	Del	WM
8 <sup>th</sup> Ave SW/SW 100 <sup>th</sup> St	B	11.3	EB App	B	12.8	EB App	B	11.5	WB App	B	12.7	EB App
4 <sup>th</sup> Ave SW/SW 100 <sup>th</sup> St	B	11.6	WB App	B	12.4	WB App	B	11.7	WB App	B	12.6	WB App
8 <sup>th</sup> Ave SW/SW 102 <sup>nd</sup> St <sup>7</sup>	A	8.4	--	A	8.6	--	B	10.9	--	B	11.9	--
Highland Park Wy SW/SW Holden St	F	56.1	EB Left	F	114.5	EB Left	D	30.1	EB Left	F	59.1	EB Left

Source: The Transpo Group, 2003.

Notes:

1. LOS, delays, and v/c ratios at signalized intersections reflect the operation of the intersection as a whole.
2. LOS = Level of Service (A-F)
3. Del = Average control delay measured in seconds per vehicle
4. V/C = Critical volume-to-capacity ratio
5. Delay for unsignalized intersections reflects the delay for the worst movement.
6. WM = Worst Movement. App = Approach EB= Eastbound WB= Westbound
7. All-way stop controlled intersection- delay represents operation of the intersection as a whole

As shown in Table 4.15-1, some intersection levels of service during the AM and PM peak hours are expected to degrade in 2012 from existing conditions. At most intersections, a slight increase in delay is expected as a result of background traffic growth and the addition of pipeline project traffic. Two intersections would degrade from existing conditions in the AM peak hour, while three intersections would degrade in the PM peak hour.

During the PM peak hour, the intersection of Highland Park Way SW/SW Holden Street is expected to degrade from LOS D to F. In the AM peak hour, this intersection would continue to operate at LOS F. Operations at 1<sup>st</sup> Avenue S/Olson Place SW would degrade from LOS D to E in the PM peak hour. One intersection, 8<sup>th</sup> Avenue SW/SW Roxbury Street would improve from LOS C to B in the AM peak hour due to the assumed optimization of timings at the intersection. The intersections that are expected to degrade in level of service from the existing condition to the 2012 No Action Alternative during the AM and PM peak hours are listed below.

**AM Peak Hour:**

- 1<sup>st</sup> Avenue S/Olson Place SW: LOS A to B
- Highland Park Way SW/W Marginal Way SW: LOS C to D

**PM Peak Hour:**

- 1<sup>st</sup> Avenue S/Olson Place SW: LOS D to E
- Highland Park Way SW/W Marginal Way SW: LOS C to D
- Highland Park Way SW/SW Holden Street: LOS D to F

## ***Transit***

As stated in the *Planned Improvements* section, there are planned improvements to transit service within the study area by 2012. In addition, the proposed future expansion of the monorail system could include expansion to West Seattle, a possible transfer opportunity for study area residents. Should monorail service be provided in West Seattle, it would supplement transit service, thus increasing transit alternatives to downtown Seattle and/or other regional transit options. In addition, Sound Transit and Metro both have route and facility adjustments planned in the future.

## ***Non-Motorized Facilities***

As noted previously, there are two planned improvements to non-motorized facilities identified within the study area by 2012, in addition to a planned pedestrian safety study. However, with a marginal increase in overall transportation modes by 2012, no significant change in non-motorized operation is expected to occur within the project vicinity.

## ***Traffic Safety***

By 2012, there would be a slight increase in the potential for traffic accidents at study intersections proportionate to the increase in traffic due to traffic growth in the area.

## ***Parking***

Future on- and off-site parking supply is expected to remain consistent with the existing supply documented in the *Affected Environment* section. Also, changes to on-street parking in the area are not anticipated.

### **4.15.2 Impacts of the Proposed Master Plan**

This section documents transportation and parking impacts within the study area for the Proposed Master Plan. It addresses project-generated impacts to the street system, traffic volumes, traffic operations, transit service and facilities, non-motorized facilities, traffic safety, and parking. The transportation and parking analysis for the Proposed Master Plan was conducted for AM and PM peak hour conditions in 2012, consistent with the potential build-out year of the Proposed Master Plan. The No Action Alternative provided a baseline for comparison to the redevelopment alternatives, by which transportation and parking impacts can be measured and mitigation measured defined, as warranted.

The Proposed Master Plan incorporates several aspects that promote diverse, walkable, compact mixed-use communities. These aspects include:

- **Mixed Use development:** Building types, sizes, prices and uses are mixed within the development. Community service and retail uses are included with housing.
- **Walkability:** Basic goods and services are available within walking distance. Sidewalks, narrow streets, and proximity of commercial and residential areas encourage walking and improve pedestrian connectivity.

- **De-emphasis on personal vehicles:** Garages are hidden in alleys, out of sight. Parallel street parking replaces parking lots. Mass transit is within walking distance of the community.

For the Proposed Master Plan, the mixed-use development, combined with the redesigned street system and upgraded pedestrian facilities would result in less traffic, increased transit use and improved pedestrian circulation.

## Redevelopment Assumptions

### ***Residential Residences***

For purposes of this Draft EIS analysis, two different redevelopment scenarios are considered, differing in the number of dwelling units (900 to 1,100), and density of housing located in the center of the redevelopment. A maximum of 1,100 residential units would be developed; as few as 900 units would be developed. The maximum was used for the transportation analysis and is considered a worst case. While the analysis considered the number of existing and proposed residences and types of new residences for each block, it is acknowledged that the number of residences developed on any specific block could vary slightly. This would not affect the analysis findings significantly. Numerous conservative measures were built into the trip generation assumptions and analysis, and minor modifications to the locations of the residences within the site would not be expected to result in any intersection operating significantly different than those disclosed herein.

### ***Non Residential Facilities***

Most of the non-residential facilities would be located along 8<sup>th</sup> Avenue SW and 7<sup>th</sup> Avenue SW. Parking for these facilities will be provided in on-street parking on 8<sup>th</sup> Avenue SW and in off-street parking lots. The Head Start program will be relocated to a new building on 100<sup>th</sup> nearer to the elementary school. The transportation and parking analysis is based on a total of approximately 83,000 usable square feet of non-residential facilities (approximately 100,000 square feet total minus interior common space and other non-trip generating space).

### **Roadway Modifications**

The Proposed Master Plan would vacate existing internal roadways and replace streets, water lines, sanitary sewers, storm drainage and other utilities. Eighth Avenue SW and 4<sup>th</sup> Avenue SW will primarily remain within their current corridors. Eighth Avenue SW would be redesigned to better accommodate higher pedestrian activity and community services. A narrower street profile with angled on-street parking and other traffic calming measures are proposed. The balance of the internal roadway system would be replaced with a new system of residential access streets to serve the redeveloped community. While much of this new road system will fall within the current corridor configuration, the design of these streets would encourage increased non-motorized circulation and safety for pedestrians. Most of the internal streets would also accommodate on-street parking on one or both sides. Alleys would provide access to parking and entrances to many of the residential residences. Planned street widths would encourage a travel hierarchy while providing pedestrian facilities and on-street parking. The on-street parking and restricted road widths would slow vehicular traffic and discourage cut-through patterns, thus providing more pleasant pedestrian experiences.



### **Non-Motorized Improvements**

In addition to providing sidewalks along at least one side of all internal streets, a major east/west pedestrian connection would be provided throughout the site, providing connection from the residential areas to the community facilities. Other pedestrian/bicycle trails would be added throughout the site. Special pedestrian crossing measures would be incorporated to key pedestrian street crossing locations along SW 100<sup>th</sup> Street and 8<sup>th</sup> Avenue SW. Design could include bulb-outs at intersections, special pavement marking and/or textures, raised pedestrian tables, or other measures.

### **Construction Impacts**

During construction, vehicle trips would be generated by delivery of construction materials and equipment, removal of demolition debris and soils and transporting construction workers to and from the site. Demolition and excavation of the existing facilities would result in some short-term traffic impacts to the surrounding area. Building demolition is expected to last approximately 2-3 months and would require exporting a total of 600 to 800 loads of debris. The most noticeable impacts related to the anticipated demolition/construction effort would be in the form of truck hauling trips, heavy equipment traffic levels, and street closures or detours. The majority of truck trips would occur in the first year of each construction phase. Trucks would be directed towards the major arterials and regional routes as directly as possible. Based on street classification, the most likely truck routes are shown in **Figure 4.15-3**.

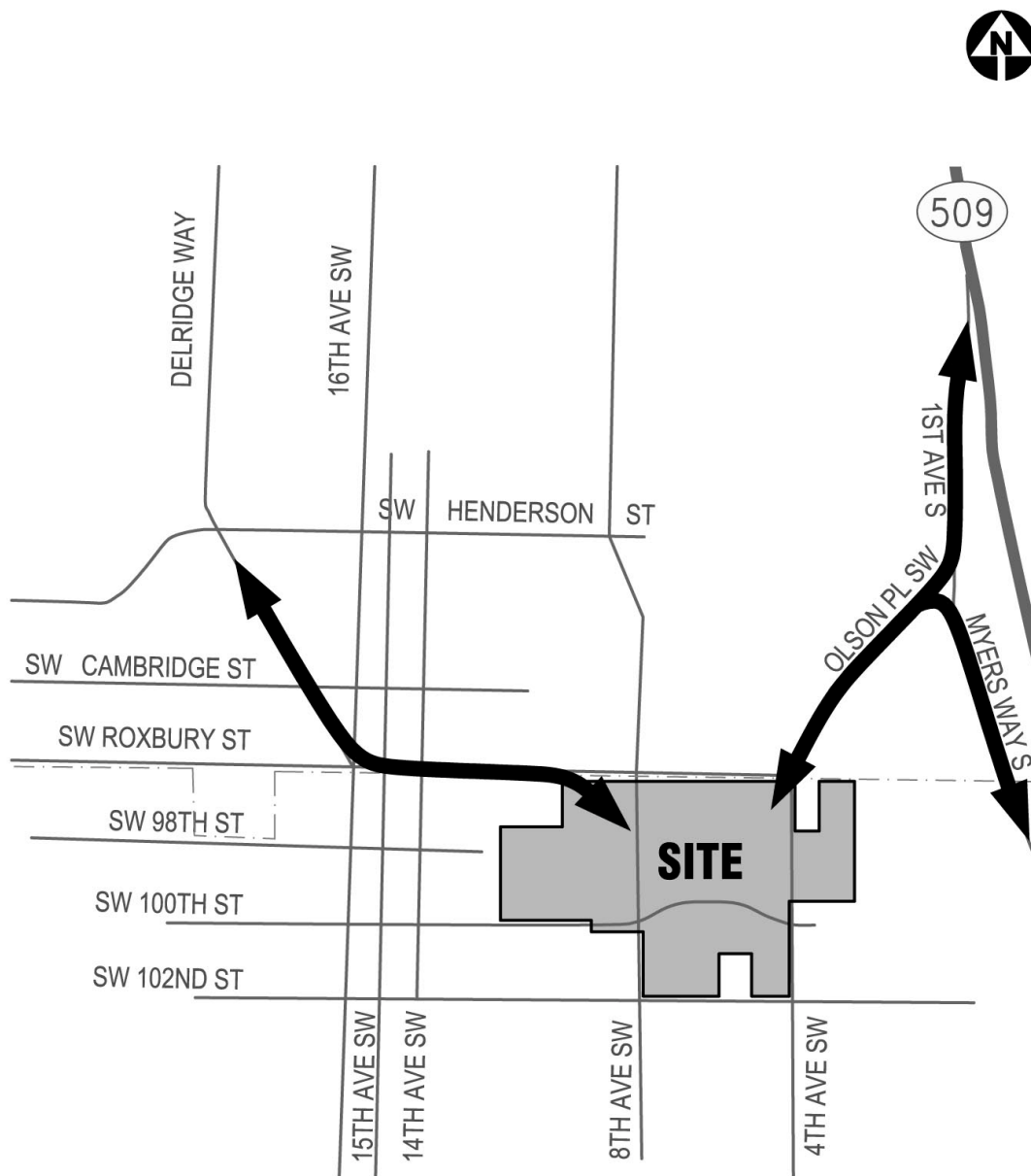
A Construction Transportation Plan would be developed and implemented to mitigate potential impacts on the local street system (see *Section 4.15.3, Mitigation Measures*).

The estimated soil volumes shown in Table 2.6-2, as well as information provided by contractors who regularly perform major excavations (Best 2002, Jacobson 2003, and McAllister 2003) were used to estimate the amount and duration of truck traffic required for dirt removal. Based on information from these contractors, the following assumptions to calculate the number of truck trips required for dirt removal and the likely duration of dirt removal activities were used: (1) soil removed from the ground typically expands in volume by about 20 percent; (2) a truck with a trailer can typically carry 22 cubic yards of soil (**Table 4.15-2**).

Table 4.15-2  
SOILS HAULING CALCULATIONS

Activity	Stage 1 and 2	Stage 3	Total
Stripping	17,000	25,500	42,500
Cut	56,400	66,900	123,300
Total Excavation	73,400	92,400	165,800
Fill retained on site	20,000	56,750	76,750
Total Export	53,400	35,650	89,050
Import	8,500	12,750	21,250
<b>Total Truck Loads</b>			
Export Fill	2,913	1,945	4,857
Imported Soils	386	580	966
<b>Total Truck Trips (2 per load)</b>			
Outbound	3,299	2,524	5,823
Inbound	3,299	2,524	5,823
<b>Total Truck Trips</b>	<b>6,598</b>	<b>5,048</b>	<b>11,646</b>

Source: The Transpo Group, 2003.



Source: The Transpo Group

Permitting agencies often limit dirt hauling to weekdays and require that PM commuter peak hours be avoided. It was assumed that dirt hauling would occur 6.5 hours per day, five days per week. Project planners indicate that the dirt hauling season for each phase of construction will take place over a three to six month period. While most of the hauling activity will occur outside of the peak commute hours, the AM inbound trips may coincide with the AM peak hours of commute traffic. This means that during Stages 1 and 2 of construction, from four to eight inbound and outbound truck trips, and for Phase 3 of construction, from three to six trips may coincide with the AM peak hours of commuter traffic.

During construction, the portions of 8th Avenue SW and SW 100th Street that run internal to the site would be closed temporarily. Additionally, limited modifications to other streets adjacent to the project could result in short-term impacts to these streets. The temporary closure of 8th Avenue SW would result in a slight increase to traffic on alternative routes, such as 6th Avenue SW, portions of Roxbury Street SW 102nd Street, and SW 100th Street as displaced cut-through traffic uses other routes. Because the closure would occur when existing on-site housing and facilities have been vacated, impacts would be limited to those vehicles which currently utilize 8th Avenue SW to travel through, not to, Park Lake Homes. This is anticipated to add no more than 10 percent to the daily traffic volumes already on the alternate routes for the duration of the closure. No other internal roads currently carry noticeable volumes of through traffic. The temporary closure would also impact transit routes which utilize these streets. Alternative location for routes and transit stops would need to be developed. School traffic, including some of the bus services, would have to be rerouted via SW 102nd Street.

## Operation Impacts

### ***Traffic Volumes***

Trip generation resulting from the Proposed Master Plan was estimated based on the net increase in housing units and redevelopment or expansion of non-residential facilities. The trips generated by these new and expanded facilities were added to the No Action Alternative scenario to forecast future traffic volumes with development of the Proposed Master Plan.

### ***Residential Trip Generation***

Trip generation associated with proposed land uses was estimated using rates identified in the ITE *Trip Generation Manual*, 6<sup>th</sup> Edition. Trip generation for the residential component of redevelopment was divided into two categories: affordable rental residences and market-rate residences. The affordable rental residences includes both the replacement of some of the existing public housing and the “workforce housing,” which is anticipated will be priced to be affordable to households earning significantly less than median income.

### ***Affordable Housing***

Low-income housing residents typically generate fewer peak hour trips as compared to other residents due to lower automobile ownership and greater use of public transit. In the City of Seattle’s *Proposed Amendments Relating to Minimum Parking Requirements for Multi-Family Uses Serving Low-Income Households* (dated August 9, 2001)<sup>1</sup>, the Puget Sound Regional

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<sup>1</sup> Seattle has since adopted the lower parking requirements for low income housing.

Council (PSRC) summarizes the average number of vehicles available by household income. The summary illustrates that as household income increases, the average number of vehicles available also increases. For example, when the study was conducted, the average number of vehicles available for a household income of \$60,000 to \$74,999 (the median household income for the Seattle-Bellevue-Everett area) was 2.06. This number declines to 1.67 for a household income of \$35,000 to \$37,499 (50 percent of the median income) or approximately 19 percent fewer cars. Based on this information, it is reasonable to assume that a low-income household would generate fewer daily and peak hour trips than a median-income household, regardless of the availability of transit and convenience of other travel modes. Therefore, the total AM and PM peak hour vehicle trips for low income housing was reduced by 19 percent. This reduction amounts to 13 trips during the AM peak hour and 15 trips during the PM peak hour. As described in the Section 3.15, based on actual data gathered, car ownership is currently estimated at 1.37 vehicles per occupied low income unit in Park Lake Homes. Therefore, the trip generation estimate, using the 19 percent reduction is considered conservative.

The ITE trip generation rate for Apartment (ITE land use 220) was used to estimate the non-adjusted traffic generation for the affordable multi-family residences including townhomes/duplexes and apartments. This land use was used instead of the Residential Condo/Townhome (LU 230), because ITE LU 230 is limited to units owned by the resident. Rental residences typically generate more traffic than non-rental residences. Therefore, the land use for apartments (LU 220) would be more conservative in estimating traffic generation. For the detached public housing, i.e. cottages, ITE Land Use Single Family Housing (LU 210) was used as a basis and then reduced by 19 percent to reflect the lower car ownership and traffic characteristics for low income occupants. The decrease in car ownership would be reflected in an increase in transit ridership, reflective of transit dependent residents.

### **Market Rate**

These residences are expected to be comprised of single-family detached homes, cottages, townhomes and condominiums. ITE rates for Single-Family Housing (LU 210) was used to estimate the traffic generation for the single-family detached homes and cottages. Residential Condo/Townhome (LU 230) was used to estimate townhome and condominium traffic generation.

### **Non-Residential Land Uses**

ITE Trip Generation rates were also used as a basis for estimating trip generation for redevelopment and expanded non-residential uses. Most proposed facilities would provide educational, social and recreational opportunities to residents of Greenbridge. For purposes of this analysis, it was assumed at up to 25 percent of the vehicle trips generated by these facilities would be generated by patrons or employees coming to and from areas outside of Greenbridge. The remaining 75 percent were assumed to be related to Greenbridge residents. Of those, residents living within approximately 800 feet of the community facilities were assumed to walk to and from these facilities. Though good internal pedestrian connections would be provided, to be conservative, no further reductions were taken. The Proposed Master Plan was reviewed to determine the percent of residences within this 800-foot radius. The Proposed Master Plan locates approximately 53 percent of those residences within walking distance to the community facilities. The result of deducting 53 percent of the trips from the 75 percent internally generated trips results in an overall deduction of approximately 40 percent of the non-residential generated trips.

**Table 4.15-3** provides a summary of estimated net new trip generation for the Proposed Master Plan.

Table 4.15-3  
GREENBRIDGE TRIP GENERATION

Land Use (net new residences or square footage) <sup>1</sup>			Daily Trips		AM Peak Hour Trips		PM Peak Hour Trips	
	Net New (Units or 1,000 sf)	Reduction <sup>2</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>
Low Income Attached Housing (ITE LU 220 Apartment)	199	19%	6.63	1,069	0.51	82	0.62	100
Low Income Detached Housing (ITE LU 210 Single Family Home)	-40	19%	9.57	-310	0.75	-24	1.01	-33
Market Rate Multi-Family Housing (ITE LU 230 Residential Condo)	146	0	5.86	856	0.44	64	0.54	79
Market Rate Single Family Housing (ITE LU 210 Single Family Home)	231	0	9.57	2,211	0.75	173	1.01	233
Public Education Space (ITE LU 540 Junior/Community College)	5.58	40%	18.36	62	1.66	6	1.66	6
Community Center (ITE LU 495 Recreational Community Center)	5.40	40%	10	33	1.32	4	1.75	6
Head Start (ITE LU 520 Elementary School)	9.90	40%	12.03	72	3.36	20	3.12	19
Library (ITE LU 590 Library)	5.00	40%	54	163	1.06	3	7.09	21
Commercial Space (ITE LU 814 Specialty Retail)	22.3	40%	40.7	547	1.03	14	2.59	35
<b>Total Trips<sup>5</sup></b>				<b>4700</b>		<b>340</b>		<b>470</b>

1 – Land Use from ITE Trip Generation, 6<sup>th</sup> Edition

2 – For low income residential, reduction based on 19 percent less car ownership (Source: PSRC). For non-residential uses, assumes 25 percent external (no reduction) and remaining 75 percent at 53 percent reduction based on percent residential units within 800'

3 – Average rates from ITE Trip Generation, 6<sup>th</sup> Edition

4 – Based on delta from existing development

5 – Rounded to closest 100 for daily, closest 10 for peak hours.

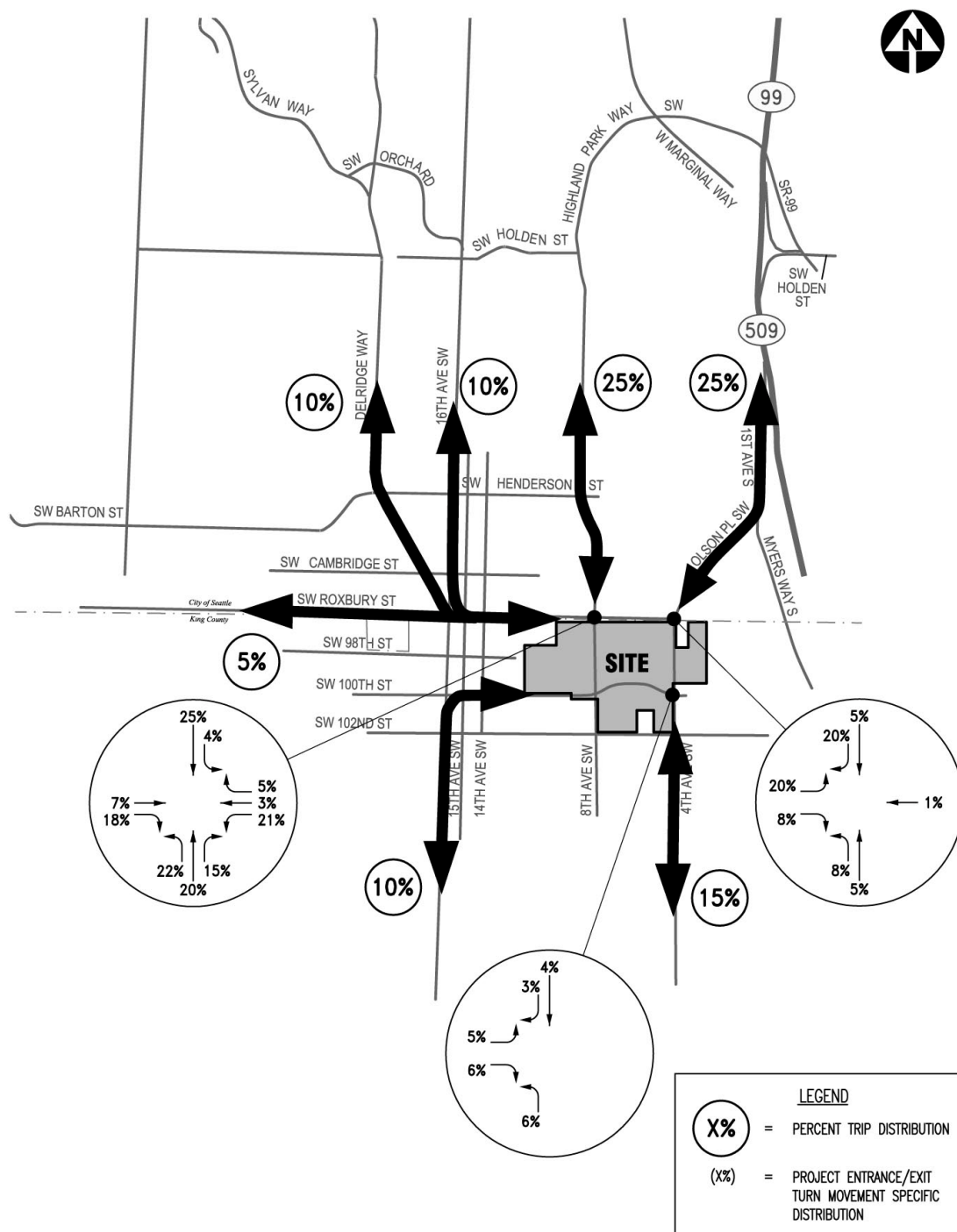
Source: The Transpo Group, 2003.

### **Trip Distribution**

Traffic that would be generated by the Proposed Master Plan was distributed to the regional roadway network based on the King County's travel model. This model provided the percent-distribution by which project trips were eventually assigned. **Figure 4.15-4** shows the project trip distribution. In addition, the figure shows the project entrance/exit turn movement specific distribution at three key project study intersections. The model indicated that 25-percent of the project traffic would come to/from 1<sup>st</sup> Avenue South, another 25-percent would come to/from Highland Park Way SW, 15-percent would come to/from 4<sup>th</sup> Avenue SW to the south, 10-percent would come to/from 16<sup>th</sup> Avenue SW to the north, 10-percent would come to/from Delridge Way, 10-percent would come to/from 16<sup>th</sup> Avenue SW to the south, and the remaining 5-percent of project traffic would come to/from SW Roxbury Street to the west of the site.

### **Trip Assignment**

Trips associated with the Proposed Master Plan were then assigned to the roadway network based on this distribution. The routes in which proposed action traffic entered and exited the site on the local roadway network was based on the type of use and their specific locations within the site. For residential uses, the net number of new residences to occupy each respective sub-area of the project site was used as the basis for the local assignment.



Source: The Transpo Group

For non-residential uses, the local assignment was based on the proposed location of the use, along with the location of the anticipated users. Non-residential uses were assumed to attract and generate vehicle trips from within the site to/from those residences beyond 800 feet, while those same land uses would also attract and generate vehicle trips to/from locations external to the site. External non-residential trips were assigned based on the King County model and the layout of the proposed street network, while the internally-based non-residential vehicle trips were assigned based on the net number of new residences to occupy each sub-area of the project site and their relation to the non-residential uses. **Figures 4.15-5** and **4.15-6** show the AM and PM peak hour Proposed Master Plan total trip assignment at study intersections.

### **Traffic Volume Impacts**

Project-generated AM and PM peak hour traffic volumes were added to 2012 Baseline (No Action Alternative) volumes to estimate peak hour volumes for the Proposed Master Plan. **Figures 4.15-7** and **4.15-8** illustrate traffic volumes (AM and PM peak hour, respectively) at study intersections for the Proposed Master Plan. By comparing total entering traffic volumes for the 2012 Baseline volumes and Proposed Master Plan, the percent impact of project traffic can be identified at study intersections, as illustrated in **Table 4.15-4**.

Table 4.15-4  
AM AND PM PEAK HOUR TRAFFIC VOLUME IMPACT – PROPOSED  
MASTER PLAN

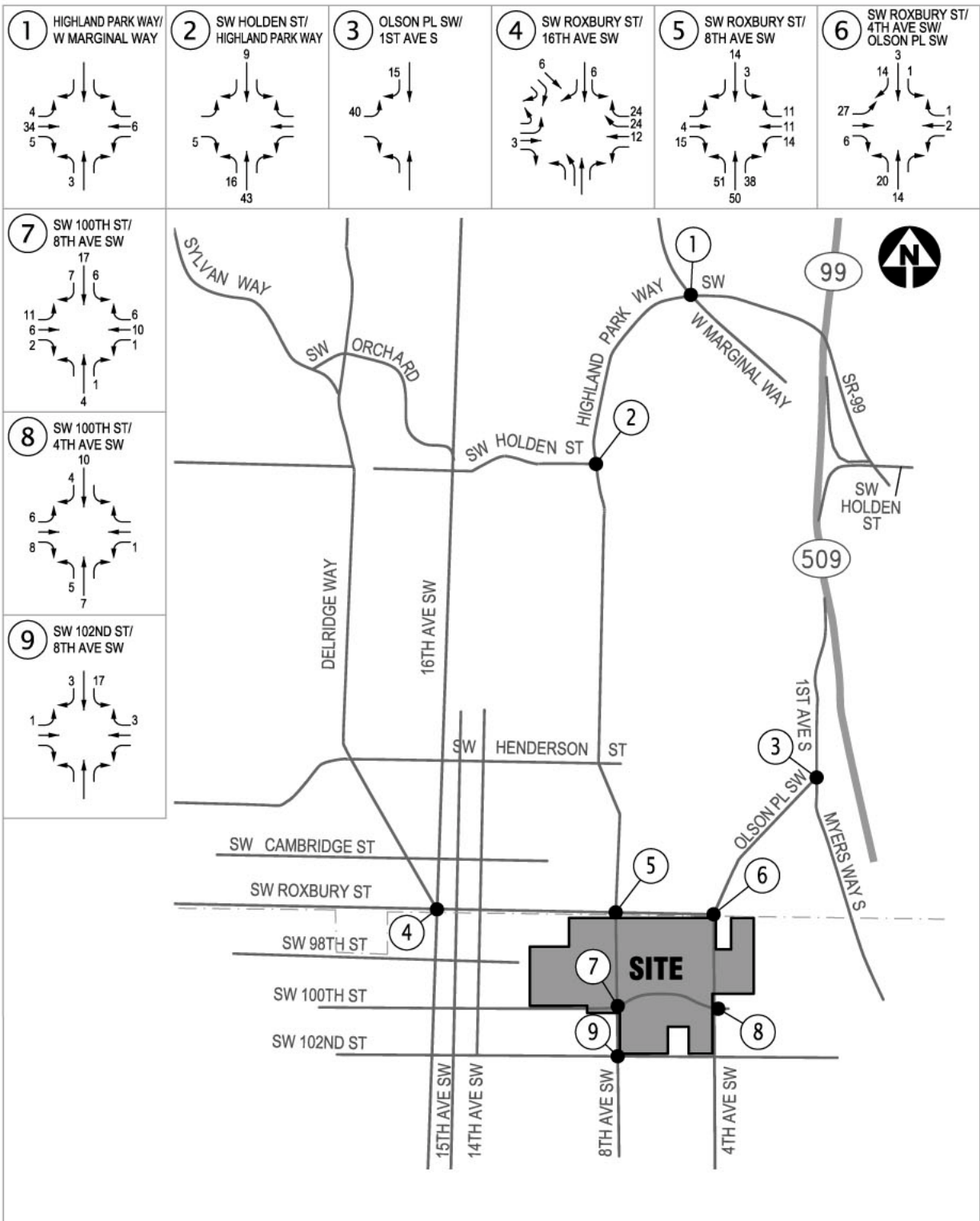
Study Intersections	2012 AM Peak Hour Trips				2012 PM Peak Hour Trips			
	2012 Baseline	Project Trips	Proposed Action	percent Impact	2012 Baseline <sup>1</sup>	Project Trips	Proposed Action	percent Impact
16 <sup>th</sup> Avenue SW/SW Roxbury Street	1,680	75	1,755	4.3%	2,190	94	2,284	4.1%
8 <sup>th</sup> Avenue SW/SW Roxbury Street	2,085	211	2,296	9.2%	2,985	271	3,256	8.3%
Olson PI SW/SW Roxbury Street	2,210	88	2,298	3.8%	2,600	140	2,740	5.1%
1 <sup>st</sup> Avenue S/Olson PI SW	2,585	55	2,640	2.1%	2,955	96	3,051	3.2%
Highland Park Wy SW/W Marginal Way SW	2,690	52	2,742	1.9%	2,695	69	2,764	2.5%
8 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	475	69	544	12.7%	550	102	652	15.6%
4 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	485	41	526	7.8%	560	59	619	9.5%
8 <sup>th</sup> Avenue SW/SW 102 <sup>nd</sup> St <sup>7</sup>	480	24	504	4.8%	875	28	903	3.1%
Highland Park Wy SW/SW Holden Street	1,535	73	1,608	4.5%	1,680	91	1,771	5.1%

Source: The Transpo Group, 2003.

### **Traffic Operations**

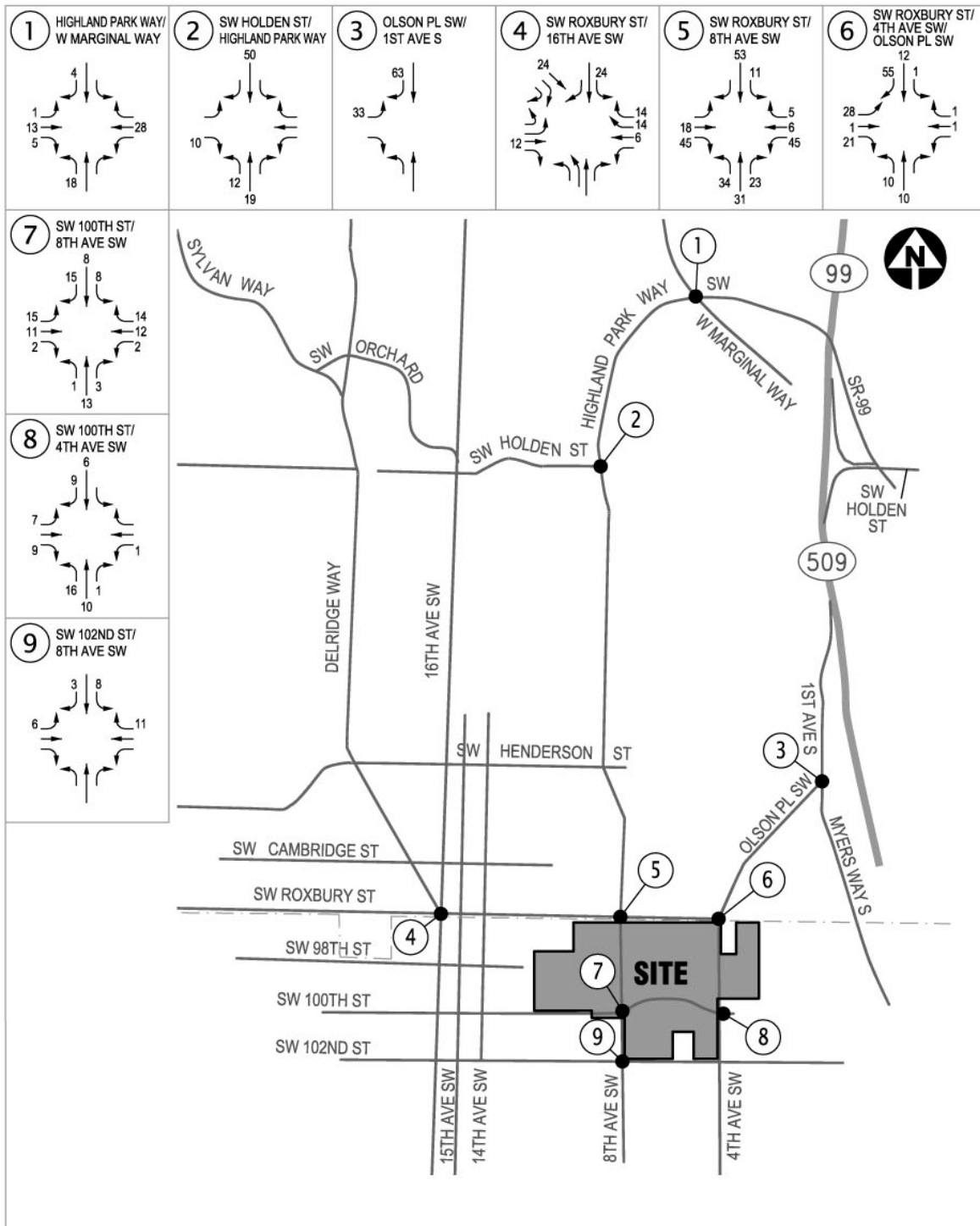
Traffic operations impacts include consideration of changes in operations of study area intersections identified in the *Affected Environment*, Section 3.15, *Transportation and Parking*, of this Draft EIS, as well as area-wide transportation concurrency based on King County's Transportation Concurrency standards.



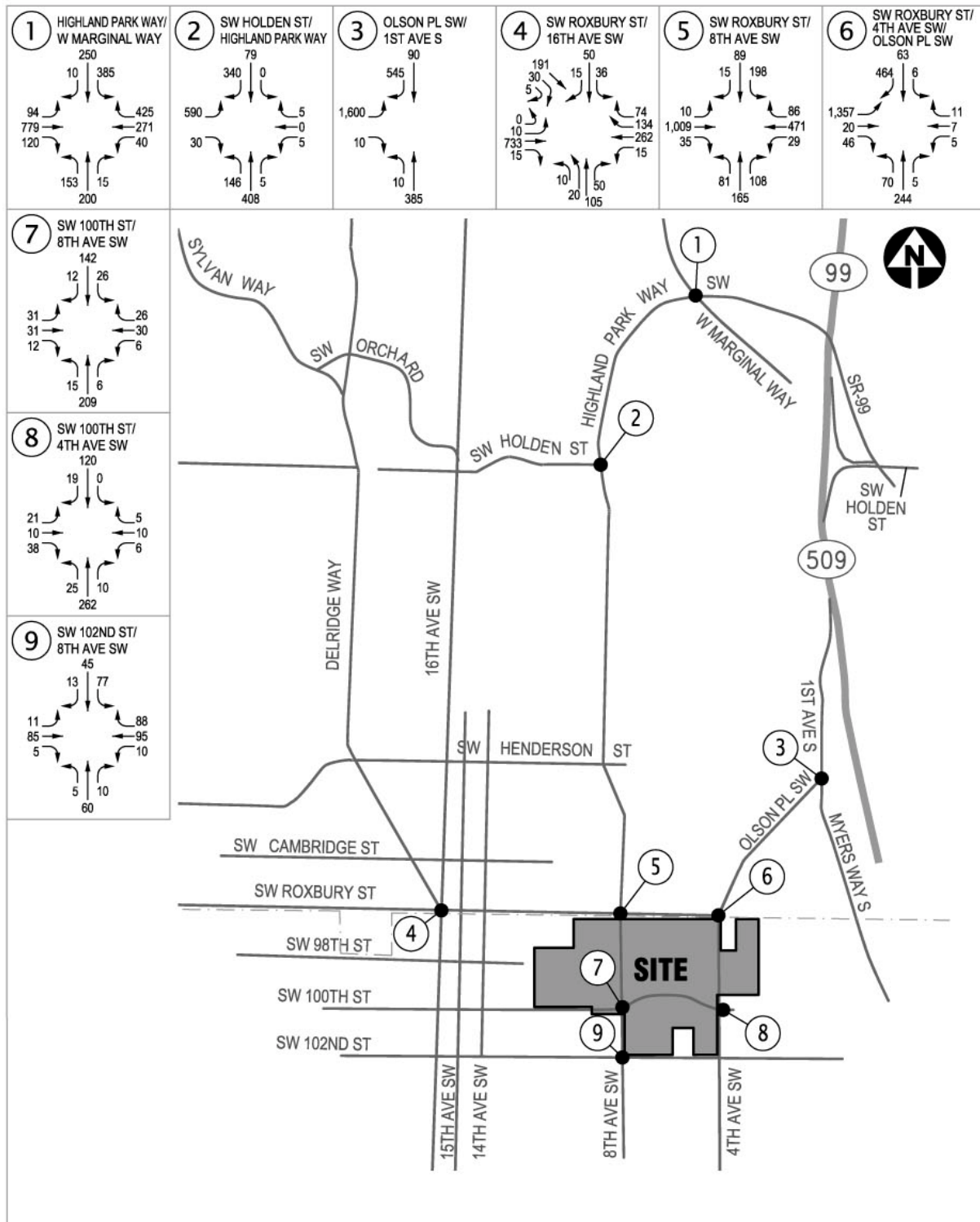


Source: The Transpo Group

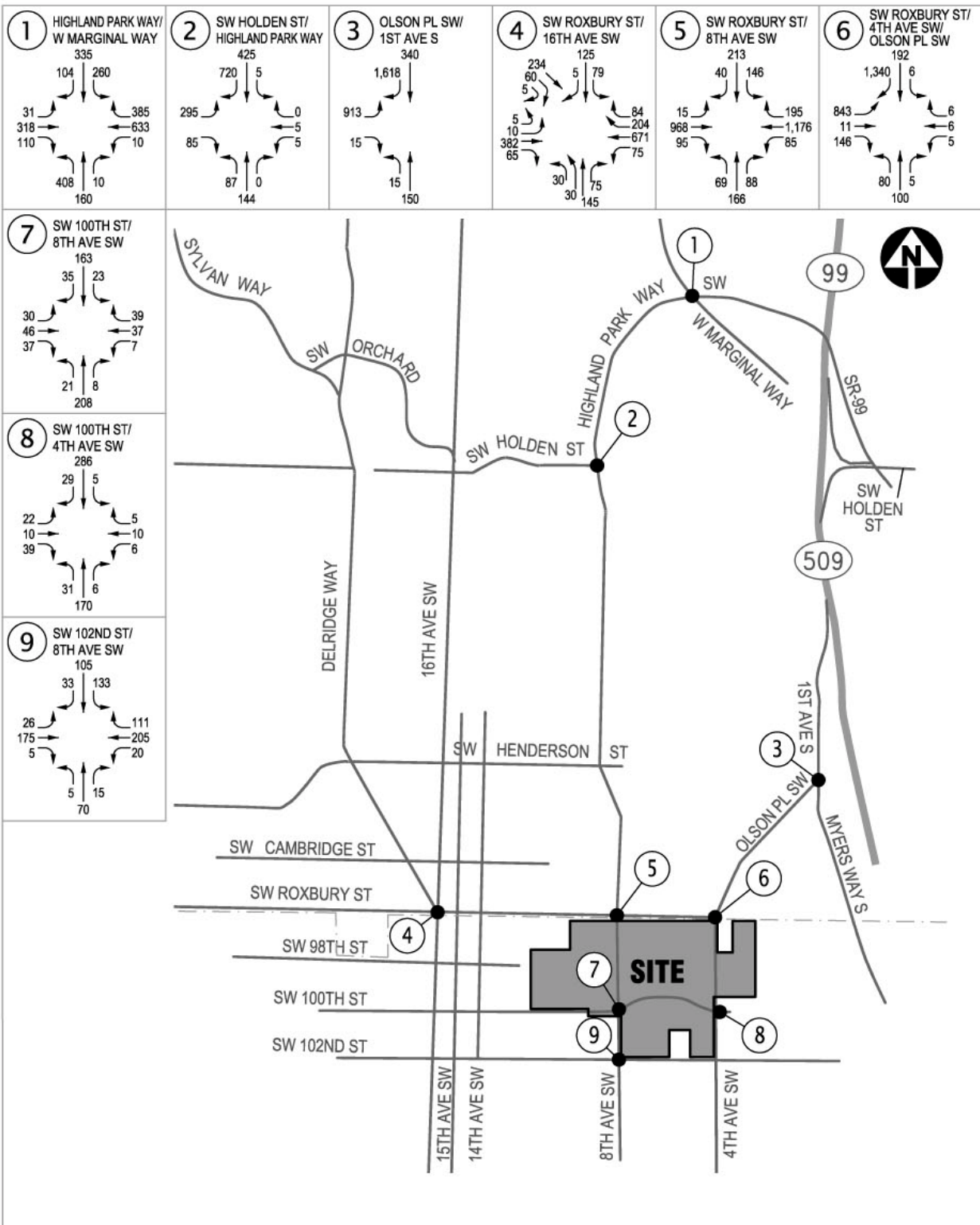




Source: The Transpo Group



Source: The Transpo Group



Source: The Transpo Group

### **Intersection Level of Service**

Based on Proposed Master Plan traffic volumes, AM and PM peak hour levels of service were calculated at study intersections. These calculations used the same intersection variables (channelization, traffic control, signal cycle lengths, etc.) as were used in evaluating the No Action Alternative. For comparison purposes, **Table 4.15-5** illustrates peak hour levels of service, average delays, and v/c ratios for the No Action Alternative and Proposed Master Plan.

As shown in Table 4.15-5, one intersection level of service is expected to degrade in 2012 with the Proposed Master Plan: 8<sup>th</sup> Avenue SW/SW Roxbury Street would degrade from LOS B to C in the PM peak hour, with a 100-percent increase in average delay per vehicle. Generally, with the exception of the intersection at Highland Park Way SW/SW Holden Street, the intersection analysis indicates that there is more than enough capacity to accommodate the proposed redevelopment and background growth in traffic in the vicinity of the site.

The largest increase in average delay per vehicle is expected at Highland Park Way SW/SW Holden Street, where an increase of average delay of 47 seconds is expected in the PM peak hour, while an increase of 39 seconds is expected in the AM peak hour where the project traffic increases intersection traffic by less than 5 percent. While project traffic is not added to the eastbound left turning movement, it does add to through movements through which the eastbound left moving drivers must find adequate gaps.

At all other study intersections, a slight increase in delay is expected as a result of project traffic.

### **Transportation Concurrency**

As required by the State's Growth Management Act, King County has adopted transportation concurrency standards to assure that new development does not outpace the ability of the local transportation infrastructure to accommodate transportation needs. For most types of planned developments in unincorporated King County, an annually-prepared concurrency map is the basis for all concurrency determinations. Based on the concurrency status of the transportation analysis zone (TAZ) in which the proposed redevelopment is located, the County determines whether or not the proposed project meets both the transportation adequacy measure (TAM) standard and critical segment standard set forth in the King County Code. The County's weekday PM peak hour traffic model is used in making this determination.

The TAM standard is defined as the maximum average volume-to-capacity (v/c) ratio listed in the County's Comprehensive Plan Policy for Transportation Service Areas for the zone in which the project is located. In addition to the TAM, the critical segment standard is applied to monitored corridors – identified by administrative rule – which have a v/c ratio of 1.10 or more and would carry more than 30 percent of the peak hour traffic generated by the zone. If the average weighted v/c ratio of roadways serving the zone exceeds the TAM standard or one or more road segments exceed the critical segment standard, then no new development can be approved and the zone is given a "red" designation on the concurrency map. If both standards are met, the zone is given a "green" designation and a Certificate of Concurrency is issued for any proposed development located within the zone.

The zone in which the project site is located is currently "green" on the County's concurrency map. Therefore, it is forecast that the adjacent roadway network can accommodate the additional traffic generated by the proposed project and King County issued a Concurrency Certificate for Greenbridge In August 2003.

Table 4.15-5  
PEAK HOUR LOS SUMMARY-2012 NO ACTION ALTERNATIVE AND PROPOSED MASTER PLAN

Signalized Intersections <sup>1</sup>	AM Peak Hour						PM Peak Hour					
	No Action Alternative (2012)			Proposed Master Plan (2012)			No Action Alternative (2012)			Proposed Master Plan (2012)		
	LOS <sup>2</sup>	Del <sup>3</sup>	V/C <sup>4</sup>	LOS	Del	V/C	LOS	Del	V/C	LOS	Del	V/C
16 <sup>th</sup> Avenue SW/SW Roxbury Street	C	23.8	0.59	C	23.9	0.60	C	29.3	0.78	C	34.4	0.84
8 <sup>th</sup> Avenue SW/SW Roxbury Street	B	16.3	0.69	B	18.1	0.78	B	15.2	0.77	C	34.9	1.01
Olson PI SW/SW Roxbury Street	B	16.5	0.71	B	18.6	0.74	B	11.7	0.47	B	12.8	0.50
1 <sup>st</sup> Avenue S/Olson PI SW	B	11.3	0.66	B	11.6	0.67	E	63.6	1.06	E	75.0	1.10
Highland Park Wy SW/W Marginal Way SW	D	37.9	0.79	D	37.9	0.75	D	35.9	0.89	D	37.6	0.91
Unsignalized Intersections	LOS	Del	WM <sup>6</sup>	LOS	Del	WM	LOS	Del	WM	LOS	Del	WM
8 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	B	12.8	EB App	B	14.1	EB App	B	12.7	EB App	C	15.1	EB App
4 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	B	12.4	WB App	B	12.9	WB App	B	12.6	WB App	B	13.5	WB App
8 <sup>th</sup> Avenue SW/SW 102 <sup>nd</sup> St <sup>7</sup>	A	8.6	--	A	8.8	--	B	11.9	--	B	12.3	--
Highland Park Wy SW/SW Holden Street	F	114.5	EB Left	F	153.1	EB Left	F	59.1	EB Left	F	106.4	EB Left

Notes:

1. LOS, delays, and v/c ratios at signalized intersections reflect the operation of the intersection as a whole.
2. LOS = Level of Service (A-F)
3. Del = Average control delay measured in seconds per vehicle
4. V/C = Critical volume-to-capacity ratio
5. Delay for unsignalized intersections reflects the delay for the worst movement.
6. WM = Worst Movement. App = Approach EB= Eastbound WB= Westbound
7. All-way stop controlled intersection- delay represents operation of the intersection as a whole

Source: The Transpo Group, 2003.

## ***Transit***

It is assumed that existing and future transit service would continue to be used as a means to access the site. Transit stops are incorporated into the design of 8<sup>th</sup> Avenue SW. The design of 100<sup>th</sup> Street also anticipates that future transit service may also utilize this street for future routes. Overall, the improved services planned by King County Metro Transit and Sound Transit are expected to accommodate any increase in ridership that would result from the Proposed Master Plan. Therefore, these additional trips would not create a significant adverse impact to transit operations in the area.

## ***Non-Motorized Facilities***

The Proposed Master Plan would provide pedestrian connections throughout the site which would encourage pedestrian travel. The revised roadway alignment and roadway configuration would provide more direct routing and sidewalk connections and shorter walking distances across the site. Improved intersection alignments would provide more identifiable roadway intersections and crosswalks, allowing safer crossing for pedestrians at more regular intervals. Proposed traffic calming measures would contribute to slowing vehicular traffic, which would help accommodate non-motorized (pedestrian and bicycle) trips.

Outside of the redevelopment, existing non-motorized facilities within the study area are sufficient to accommodate the Proposed Master Plan trip generation that would access the site via pedestrian or bicycle facilities. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur.

## ***Traffic Safety***

There would be a slight increase in the potential for traffic accidents at study intersections, proportionate to the increase in traffic from the Proposed Master Plan. As noted previously, the Proposed Master Plan is anticipated to increase peak hour intersection traffic by a range of 2 to 16-percent at the study intersections during the AM and PM peak hours. Mitigation measures are suggested to improve safety concerns created by existing sight distance inadequacies at the intersection of Roxbury Street and SW 8<sup>th</sup> Avenue (see mitigation section).

As was detailed in Section 3.15, King County identified 3 high accident locations (HALs) that are located in the immediate vicinity of the project site: SW 100<sup>th</sup> Street/White Center Cut-off, 17<sup>th</sup> Avenue SW/SW 98<sup>th</sup> Street, and 8<sup>th</sup> Avenue SW/SW 108<sup>th</sup> Street. Based on the project trip distribution from the County's traffic model, no project trips were distributed to any of these 3 County-identified high accident locations during the PM peak hour. However, throughout the course of the day, a few project trips deviate from the identified trip distribution routes given in Figure 4.15-3, which may proportionately increase the potential for a collision at these locations.

Historic collision records included in Section 3.15 showed that 16<sup>th</sup> Avenue SW between SW Roxbury Street and SW 102<sup>nd</sup> Street has a relatively high number of accidents per million vehicle miles (MVM) rate. A portion of 16<sup>th</sup> Avenue SW (from SW 100<sup>th</sup> Street to the south) would be impacted by approximately 10-percent of the project trips, or approximately 47 PM peak hour project trips. Section 3.15 also noted a relatively high MVM rate for 4<sup>th</sup> Avenue SW, between SW Roxbury Street and SW 102<sup>nd</sup> Street. The amount of projected project impact to this section of roadway varies due to the location of internal site roadways that access 4<sup>th</sup> Avenue SW. However, as was noted in the affected conditions section, 33-percent of the



collisions on this roadway occurred directly at 4<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street. The project is anticipated to impact this intersection with approximately 70 new PM peak hour trips, though this is likely a relatively small percentage of the total traffic entering the intersection. The signalization of 4<sup>th</sup> Avenue SW/SW 102<sup>nd</sup> Street has been identified by King County as a high priority in its 2001-2020 Transportation Needs Report.

King County has identified five high accident roadways (HARs) in the immediate vicinity, which were listed in the affected environment section. Based on project trip distribution from the County's traffic model the 16<sup>th</sup> Avenue SW/SW Roxbury Street area HAR (which begins and ends north of SW 100<sup>th</sup> Street) and the 15<sup>th</sup> Avenue SW/SW 98<sup>th</sup> Street HAR (County HAR #51) are not impacted by PM peak hour trips project trips, as Figure 4.15.1 shows that PM peak hour project trips are anticipated to use those portions of 16<sup>th</sup> Avenue SW that are North of SW Roxbury Street and South of SW 100<sup>th</sup> Street. However, due to the retail nature of 15<sup>th</sup> and 16<sup>th</sup> Avenues in this area, some proportional increase in collisions may occur due to project trips to the extent by which Greenbridge residents utilize the services in the HAR areas. King County has recommended a countermeasure for the 16<sup>th</sup> Avenue SW HAR consisting of a parking study to assess feasibility of relocating or reconfiguring existing parking, while recommending the installation of signs restricting left turns along the 15<sup>th</sup> Avenue SW HAR.

The 16<sup>th</sup> Avenue SW/SW 107<sup>th</sup> Street area HAR (County HAR #3) and 16<sup>th</sup> Avenue SW/SW 112<sup>th</sup> Street area HAR (County HAR #41) are both impacted by 10-percent of the proposed project's trips, amounting to an impact of approximately 47 PM peak hour trips and 470 daily trips, a relatively small percentage of the overall existing traffic along 16<sup>th</sup> Avenue SW. The County has recommended improvements to the 16<sup>th</sup> Avenue SW/SW 107<sup>th</sup> area HAR that includes restricting left turns from driveways in the area, while no specific improvement has been recommended for the 16<sup>th</sup> Avenue SW/SW 112<sup>th</sup> area HAR, as no identifiable collision pattern has been identified.

The SW 116<sup>th</sup> Street/8<sup>th</sup> Avenue SW HAR (County HAR #50) would likely be impacted by some degree of project trips, in particular those that may attend or visit neighboring Evergreen High School. While the PM peak hour distribution does not directly show impact to this HAR, some minor project trip impact can be expected. King County has recommended the addition of edgeline striping along this roadway section.

Washington State Department of Transportation has identified a high accident location (HAL) and a high accident corridor (HAC) both of which are in the immediate project vicinity. Both were described in the affected environment section. As noted, additional information regarding the accidents in this location is being sought.

Based on the additional information available regarding accidents at these WSDOT HAL and HAC locations, King County Housing Authority will explore potential mitigation with WSDOT. This mitigation, if any, would be disclosed in the Final Environmental Impact Statement.

### ***Parking***

As noted, the parking supply includes both on- and off-street parking within the development. The combined street and off-street parking assumed to be available to Greenbridge resident's averages to a ratio of approximately 2.1 spaces per residential unit, about ¾ of which is located off-street. All detached market rate homes and townhouses (approximately 270 of the total residential units) will have two off-street parking spaces. The balance of the off-street parking equates to approximately 1.5 off-street spaces per unit. ITE's average peak parking generation

rate for Residential Condominium (Land Use 230) is 1.11 and 1.21 for low/mid rise apartments (LU 221).<sup>2</sup> Site-wide, the weighted peak parking demand for all residential units, at 2 units for detached market housing, 1.11 for market cottages and condominiums and 1.37 for public and workforce multi-family housing is 1.45 per unit. The proposed off-street supply of 1.64 for all units indicates that the peak parking demand for all residential units can be met on-site. The site-wide ratio of 2.1 spaces per residential unit, including the on-street parking, would accommodate additional spaces for visitors and service vehicles. As noted earlier, based on recent utilization counts, average car ownership for the low-income housing in Park Lake Homes is 1.37 per occupied unit. This is well within the site-wide ratio of 2.1 spaces per residential unit. These calculations are summarized in **Table 4.15-6**.

Table 4.15-6  
RESIDENTIAL PARKING

Land Use Type	Detached Market Rate Homes	Market Rate Townhomes and Condominiums	Public and Workforce Multi-family Units	Weighted Average or Total
Number of Units (Demand) <sup>3</sup>	207	170	726	1,103
Peak Parking Demand per Unit	2 <sup>4</sup>	1.11 <sup>5</sup>	1.37 <sup>6</sup>	1.45
Total Demand By Type	414	189	995	1,597
Number of Units (Supply) <sup>7</sup>	207	170	726	1,103
Proposed Off-Street Supply (per unit)	2.00	1.53	1.53	1.64
Total Off-Street Supply	538	166	1,110	1,814
Total Residential Parking, including 502 on-street Spaces				2316
Site-wide Residential Parking Per Unit				2.1

Source: The Transpo Group, 2003.

Another approximately 263 spaces will be available (approximately 151 in surface parking lots and the balance on-street) to serve proposed community and commercial facilities. Peak parking demand for community facilities is typically around 2 spaces per 1,000 ksf and general retail is typically in the neighborhood of 4.0 spaces per thousand square feet of floor space. With more than half of the residents living within 800 feet of the community facilities, and based on the lower car ownership of many of the residents and patrons of the community facilities, the peak parking demand for these facilities is anticipated to be less than half the typical demand for these types of facilities. The proposed parking supply would meet the anticipated parking demand. Furthermore, mid-day parking utilization observations indicate that the low-income residential demand reduces to 0.63 per occupied unit. Since this is significantly less than the measured car ownership for low-income residents as well as the proposed parking supply for these residents, and because much of the housing located near the commercial businesses is for low-income occupants, there will be opportunities for shared parking of the commercial and residential parking supply.<sup>8</sup>

<sup>2</sup> ITE Parking Generation, 2<sup>nd</sup> Edition, 1987.

<sup>3</sup> For demand detached homes and market rate townhomes fall in different categories by ITE definition.

<sup>4</sup> No known source for peak demand for detached market housing. Assumed two based on car ownership information cited in project trip generation section.

<sup>5</sup> Source: ITE Parking Generation, 2<sup>nd</sup> Edition, 1987

<sup>6</sup> Source: Park Place Homes vehicle count, October, 2003.

<sup>7</sup> For supply, based on development plan, both detached homes on market townhomes will be supplied with 2 spaces per unit. The remaining units may be supplied with off-street spaces immediately adjacent to the unit or in common lots or garages, so specific number of parking spaces per each unit not identified.

<sup>8</sup> From review of 2001 mid-day, mid-week aerial photograph.



### 4.15.3 Mitigation Measures

#### Construction

King County would evaluate the need for a Construction Transportation Plan to mitigate potential impacts of construction on the local street system. The plan could include hours of construction; hours for hauling of dirt and construction materials (permitting agencies often limit dirt-hauling to weekdays and require that commuter peak hours be avoided); truck hauling routes; strategies for providing temporary parking for construction workers, detour routes and location of signs and flaggers and other measures as needed.

A temporary detour plan, outlining planned street closures and detour routing, would be developed in conjunction with the project construction phasing schedule to ensure adequate accessibility to still occupied residences and newly constructed residences as the demolition/construction process unfolds. Coordination with King County and City of Seattle for street closures and detouring would also be required.

#### ***Roadway and Intersection Mitigation***

With the Proposed Master Plan, no study intersections would degrade to a LOS of E or worse as a result of project traffic. Thus, no level of service related mitigation is anticipated to be necessary.

#### **8th Avenue SW/SW Roxbury Street**

Existing sight distance is limited in the vicinity of SW Roxbury Street and 8th Avenue SW and has contributed to the number of accidents at this intersection. While modifications to the roadway profile are not likely to be physically or financially possible, safety improvements could be instituted by installing advance notification of upcoming stopping traffic on eastbound SW Roxbury Street west of 8th Avenue SW and prohibiting northbound right turns on red. Both improvements would likely reduce the frequency of rear-end and T-bone accidents. The first improvement could include an interconnection to the intersection signal to provide advanced warning through flashing yellow lights or other indicator triggered when eastbound traffic is stopped, or soon to be stopped at SW Roxbury Street/8th Avenue SW.

There is also a perception of long delays for westbound left-turning vehicles due to inadequate gaps in and high travel speeds of eastbound vehicles during peak hour. Given the two-phase operation of the traffic signal, no protected phase exists for westbound lefts and instead, these motorists must wait for simultaneous gaps in the two eastbound travel lanes. Traffic safety could be improved by introducing an additional phase serving westbound left-turning, through, and right-turning traffic only. This improvement would provide a protected phase for westbound traffic turning left onto southbound 8th Avenue SW and would likely reduce the number of left-turn type accidents at this location. Depending on the peak hour and redevelopment scenario, SW Roxbury Street/8th Avenue SW would operate at LOS C/D as a three-phase signal with a slight increase in overall average delay per vehicle at the intersection as a whole.

While other potential mitigation measures related to conversion of existing through lanes to exclusive turn lanes were explored, they did not provide adequate Levels of Service and were therefore not further considered.

### **Highland Park Way/SW Holden Street.**

In the previous analysis for the High Point (City of Seattle) redevelopment project, three possible mitigation measures were explored to improve operations for the critical eastbound left-turning movement at Highland Park Way SW/ SW Holden Street. These measures included: (1) stopping all traffic with the exception of the northbound through movement; (2) construction of a roundabout; or (3) installation of a traffic signal. The first alternative would not be a viable option as average delays associated with the eastbound left-turning movement would actually increase. Average delays for the northbound left-turning movement and southbound approach would similarly increase. Both the 2<sup>nd</sup> and 3<sup>rd</sup> alternatives would significantly reduce average delays for eastbound left-turning traffic (LOS A-B range) while increasing average delays for the northbound and southbound approaches.

### ***MPS Fees***

In order to ensure that financial commitments are in place so that adequate transportation facilities are available to serve new growth and development, King County imposes a Transportation Impact Fee on new development. The fees are determined based on estimated “fair share” contributions to identified improvements and their estimated costs. Fees for the contribution of proposed non-residential uses is based on the distribution of their forecasted trips through the identified roadway improvement, using a County traffic model. From this a “fair share” or percent of project traffic as a portion of the estimated cost for that improvement is used to set the impact fee. For residential uses, a set impact fee per unit is identified, based on the location of the project. Current fees across the County range from less than \$20 to over \$6,500 per detached single-family residential unit. Multi-family housing is calculated at 60 percent of the single family rate. Generally, fees are lower in areas where few improvement projects are needed to provide capacity for projected future traffic. The project site is located in MPS Zone 182. Currently the MPS fee for each new single-family home is \$48 per single family unit and \$29 for each multi-family unit. Fees are updated regularly, reflecting updates to the model as well as the project list and estimated cost for improvements. Fees are calculated and paid when application is made for a specific building permit.

Public housing agencies or private non-profit housing developers providing publicly sponsored or subsidized housing programs may apply for exemptions from MPS fee requirements. Private developers who dedicate residential units for occupancy by low or moderate income housing may apply for reductions in MPS fees. The estimated impact fee for Greenbridge will depend on how many of the “workforce” residences fit the definition for “low income” housing. For the market rate housing, the impact fee would be approximately \$12,800. Based on the number of market rate single family (177) and multi-family (148) residences proposed.

## **4.15.4 Impacts of the Design Alternative Master Plan**

### **Redevelopment Assumptions**

While the number, size and types of non-residential facilities is similar to the Proposed Master Plan, with the exception of the location of the Head Start building, there are some minor modifications to the location and types of housing units proposed. There are also some major differences to the proposed street grid and internal circulation, particularly on the west side of 8<sup>th</sup> Avenue SW.

## ***Residential Development***

**Table 4.15-7** summarizes the make-up of the housing proposed in the Design Alternative Master Plan.

Table 4.15-7  
EXISTING AND DESIGN ALTERNATIVE MASTER PLAN HOUSING

Type of Unit	Existing		Proposed Master Plan	
	Multi-family	Single-family	Multi-family	Single-family
Public Housing	480	87	286	14
Workforce Housing	0	0	483	0
Market Rate	0	0	206	111

Parking for the residential uses is provided by a combination of off-street driveways, garage and surface lots, many accessible by alleys. Additional parking would be available on-street.

## ***Non Residential Facilities***

Non-residential development would be similar in use, size, location and upgrades to existing buildings as described for the Proposed Master Plan. In the Design Alternative Master Plan, however, the Head Start building is located adjacent to SW 100<sup>th</sup> Street, east of the Elementary School. Most of the non-residential facilities would be located along 8<sup>th</sup> Avenue SW. Parking for these facilities would be provided in on-street parking on 8<sup>th</sup> Avenue SW and in off-street parking lots.

## **Roadway Modifications**

The Design Alternative Master Plan proposes a more traditional street grid system than the existing street configuration and Proposed Master Plan. As such, the length of streets internally, tends to be longer and vehicle routes more direct. While this configuration may tend to encourage higher vehicle travel speeds, the proposed narrower roadway width and on-street parking would help reduce travel speeds. Eighth Avenue SW and 4<sup>th</sup> Avenue SW would primarily remain within their current corridors. As with the Proposed Master Plan, 8th Avenue SW would be redesigned to better accommodate the higher levels of pedestrian travel and community services activities anticipated. A narrower street profile with angled on-street parking and other traffic calming measures are proposed. Other streets are proposed to be rebuilt with pedestrian and bicycle compatible facilities to encourage increased non-motorized circulation and safety. Most of the internal streets would also accommodate on-street parking on one or both sides. Alleys would provide access to parking and entrances to many of the residential units.

## **Non-Motorized Improvements**

Sidewalks would be provided along all internal streets. A centrally located east/west pedestrian connection would be provided where the street grid does not continue through the central core, providing connection from the residential areas to the community facility core. Special pedestrian crossing measures would be incorporated at key pedestrian street crossing locations

along SW 100<sup>th</sup> Street and 8<sup>th</sup> Avenue SW. Design could include bulb-outs at intersections, special pavement marking and/or textures, raised pedestrian tables or other measures.

## Construction Impacts

During construction, the portions of 8th Avenue SW and SW 100th Street that run internal to the site would require temporary closure. Additionally, limited modifications to other streets adjacent to the project may result in short-term impacts to these streets. Impacts would be the same as described for the Proposed Master Plan.

**Table 4.15-8** provides estimated soils hauling calculations for the Design Alternative Master Plan. Calculations related to soils hauling for the Proposed Master Plan are also provided as a comparison. Calculations are based on the same assumptions regarding soils expansion and truck hauling capacity as described in this section under Construction Impacts of the Proposed Master Plan.

Because the Design Alternative Master Plan assumes major realignment of the existing street system and regarding, more than twice the amount of soil will need to be cut and excavated from the site, and more than twice the fill material would need to be imported to the project site than with the Proposed Master Plan. The duration of the hauling activities could last nearly twice as long as that for the Proposed Master Plan. A Construction Transportation Plan would be developed and implemented as needed to mitigate potential impacts on the local street system (see Mitigation Measures).

Table 4.15-8  
SOILS HAULING CALCULATIONS

Activity	Proposed Master Plan	Design Alternative Master Plan
Stripping	42,500	42,500
Cut	123,300	290,000
Total Excavation	165,800	332,500
Fill retained on site	76,750	140,000
Total Export	89,050	192,500
Import	21,250	45,500
<b>Total Truck Loads</b>		
Export Fill	4,857	10,500
Imported Soils	966	1,932
<b>Total Truck Trips (2 per load)</b>		
Outbound	5,823	12,432
Inbound	5,823	12,432
<b>Total Truck Trips</b>	<b>11,646</b>	<b>24,854</b>

## Operation Impacts

### Traffic Volumes

Trip generation resulting from the Design Alternative Master Plan is estimated based on the net increase in housing units and redevelopment expansion of non-residential facilities. The trips

generated by these new and expanded facilities are added to the No Action Alternative scenario to forecast future traffic volumes.

### ***Residential Trip Generation***

Approximately 25 percent of the residential units built under the Design Alternative Master Plan would be available for public housing, another approximately 45 percent would be affordable or “workforce” rental units, and the balance would be market rate housing, available for purchase by the public. Trip generation associated with the proposed land uses was estimated using rates identified in the ITE *Trip Generation Manual*, 6<sup>th</sup> Edition. As described for the Proposed Master Plan, low income housing trip rates were reduced by 19% to reflect lower car ownership. Other residential trip rates per unit assumed in the Proposed Master Plan analysis were also assumed for the Design Alternative Master Plan analysis.

### **Non-Residential Land Uses**

As noted earlier, the non-residential component for both the Proposed Master Plan and Design Alternative Master Plan are basically the same. For purposes of this analysis, it was assumed at up to 25 percent of the vehicle trips generated by the non-residential facilities would be generated by patrons or employees coming to and from areas outside of the project site. The remaining 75 percent were assumed to be related to on-site residents. Of those, the residents living within approximately 800 feet of the community facilities were assumed to walk to and from these facilities. Though good internal pedestrian connections will be provided, to be conservative no further reductions were taken. The Design Alternative Master Plan was reviewed to determine the percent of residential units within this 800-foot radius. The distribution on housing units in the Proposed Master Plan locates approximately 58 percent of those units within walking distance to the community facilities, slightly more than in the Proposed Master Plan. Deducting 58 percent of the trips from the 75 percent internally generated trips would result in an overall deduction of approximately 44 percent of the non-residential generated trips.

**Table 4.15-9** provides a summary of the estimated net new trip generation for the Design Alternative Master Plan.

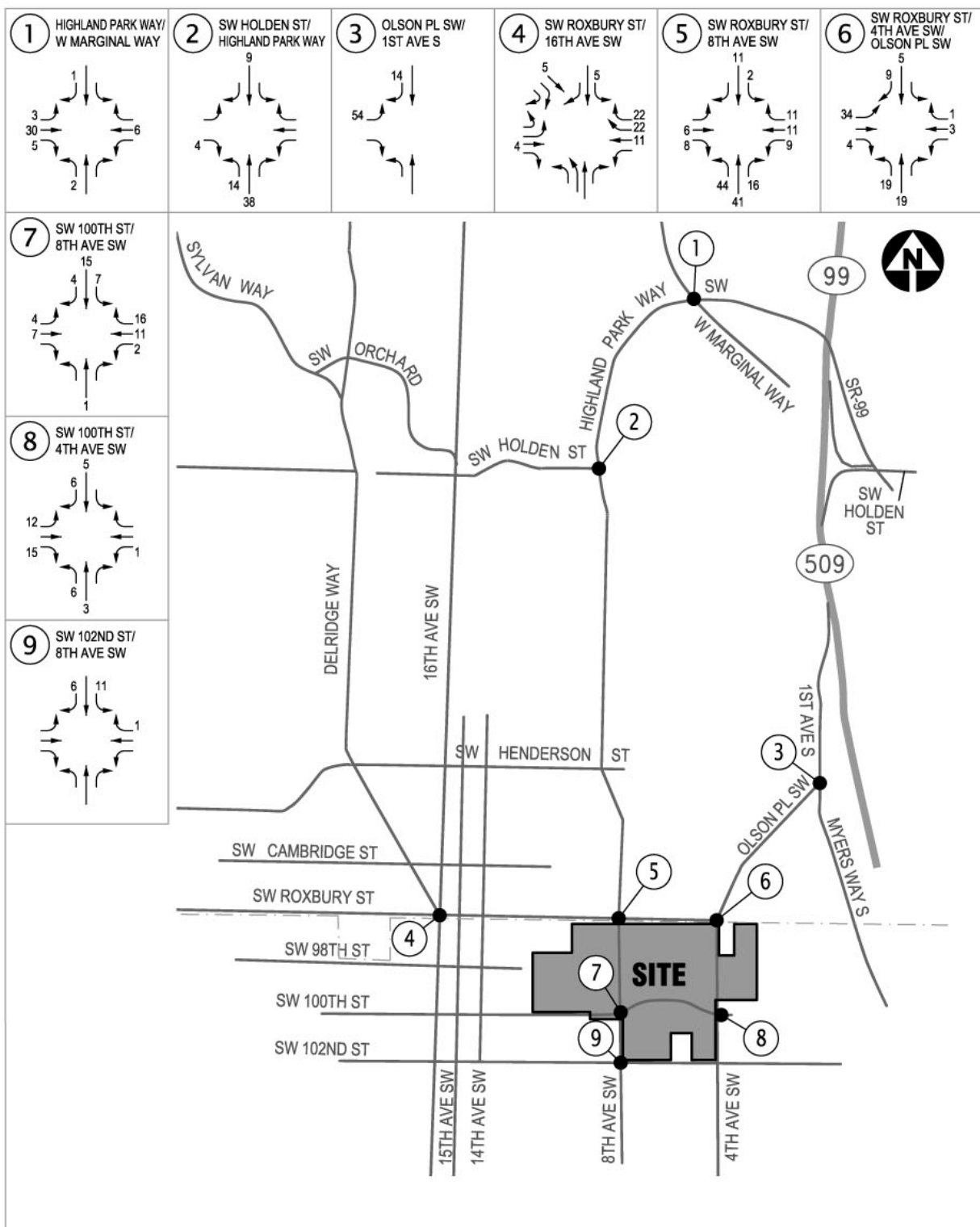
The Design Alternative Master Plan would generate slightly fewer vehicle trips than the Proposed Master Plan. This is due to the slightly higher proportion of housing that is market rate single-family homes (the highest trip generation rates for residential types) and the higher percentage of residences located within walking distance to the community facilities.

### **Trip Distribution**

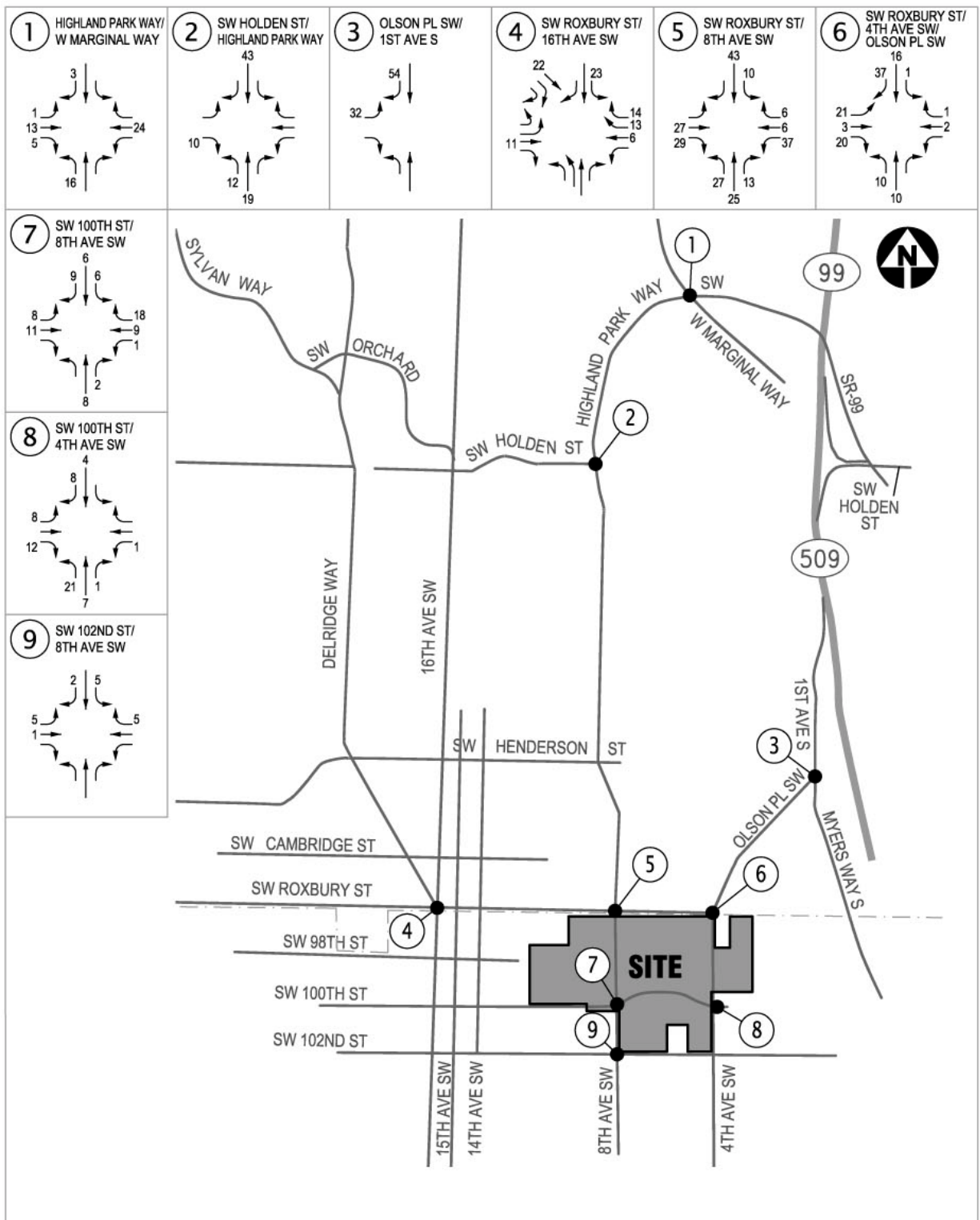
Trips were distributed to the regional roadway network based on the King County’s travel model.

### **Trip Assignment**

Trips associated with the Design Alternative Master Plan were then assigned to the roadway network based on this established distribution. The routes in which the Design Alternative Master Plan traffic entered and exited the site on the local roadway network was based on the type of use and their specific locations within the site, which differed slightly from the Proposed Master Plan. **Figures 4.15-9 and 4.15-10** show the AM and PM peak hour for the Design Alternative Master Plan total trip assignment at study intersections.



Source: The Transpo Group



Source: The Transpo Group



Table 4.15-9  
ESTIMATED VEHICLE TRIP GENERATION FOR DESIGN ALTERNATIVE  
MASTER PLAN

Land Use (net new residences or square footage) <sup>1</sup>	2012 AM Peak Hour Trips				2012 PM Peak Hour Trips			
	Net New (Units or 1,000 sf)	Reduction <sup>2</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>	ITE Rate <sup>3</sup>	Net New Trips <sup>4</sup>
Low Income Attached Housing (ITE LU 220 Apartment)	291	19%	6.63	1,563	0.51	120	0.62	146
Low Income Detached Housing (ITE LU 210 Single Family Home)	-75	19%	9.57	-581	0.75	-46	1.01	-51
Market Rate Multi-Family Housing (ITE LU 230 Residential Condo)	206	0	5.86	1,207	0.44	91	0.54	111
Market Rate Single Family Housing (ITE LU 210 Single Family Home)	111	0	9.57	1062	0.75	83	1.01	112
Public Education Space (ITE LU 540 Junior/Community College)	5.58	44%	18.36	58	1.66	5	1.66	5
Community Center (ITE LU 495 Recreational Community Center)	5.40	44%	10	31	1.32	4	1.75	5
Head Start (ITE LU 520 Elementary School)	9.90	44%	12.03	67	3.36	19	3.12	17
Library (ITE LU 590 Library)	5.00	44%	54	153	1.06	3	7.09	20
Commercial Space (ITE LU 814 Specialty Retail)	22.3	44%	40.7	513	1.03	13	2.59	33
<b>Total Trips<sup>5</sup></b>				<b>4,100</b>		<b>300</b>		<b>390</b>

1 – Land Use from ITE Trip Generation, 6<sup>th</sup> Edition

2 – For low income residential, reduction based on 19% less car ownership (Source: PSRC). For non-residential uses, assumes 25% external (no reduction) and remaining 75% at 53% reduction based on % residential units within 800'

3 – Average rates from ITE Trip Generation, 6<sup>th</sup> Edition

4 – Based on delta from existing development

5 – Rounded to closest 100 for daily, closest 10 for peak hours.

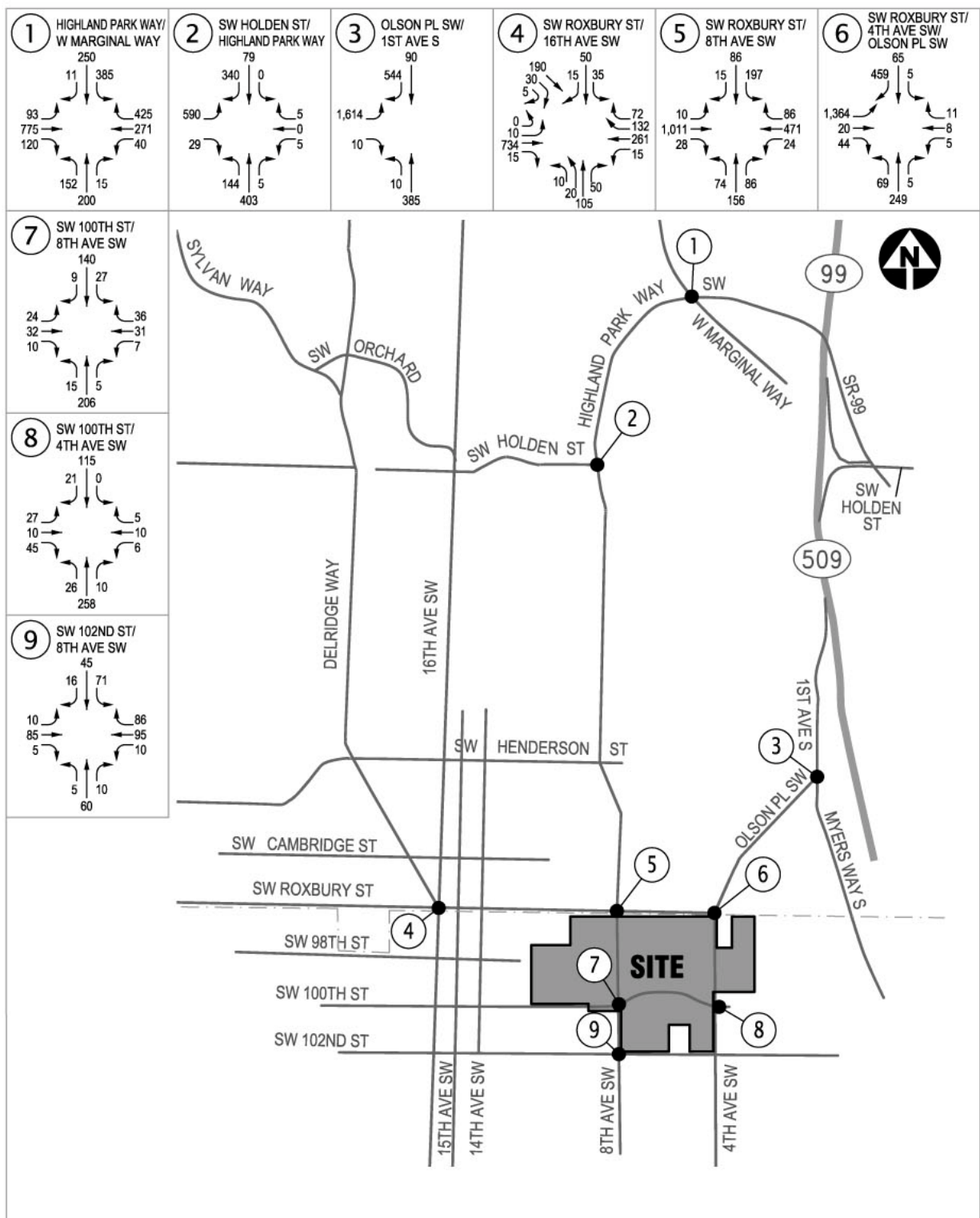
Source: The Transpo Group, 2003.

### Traffic Volume Impacts

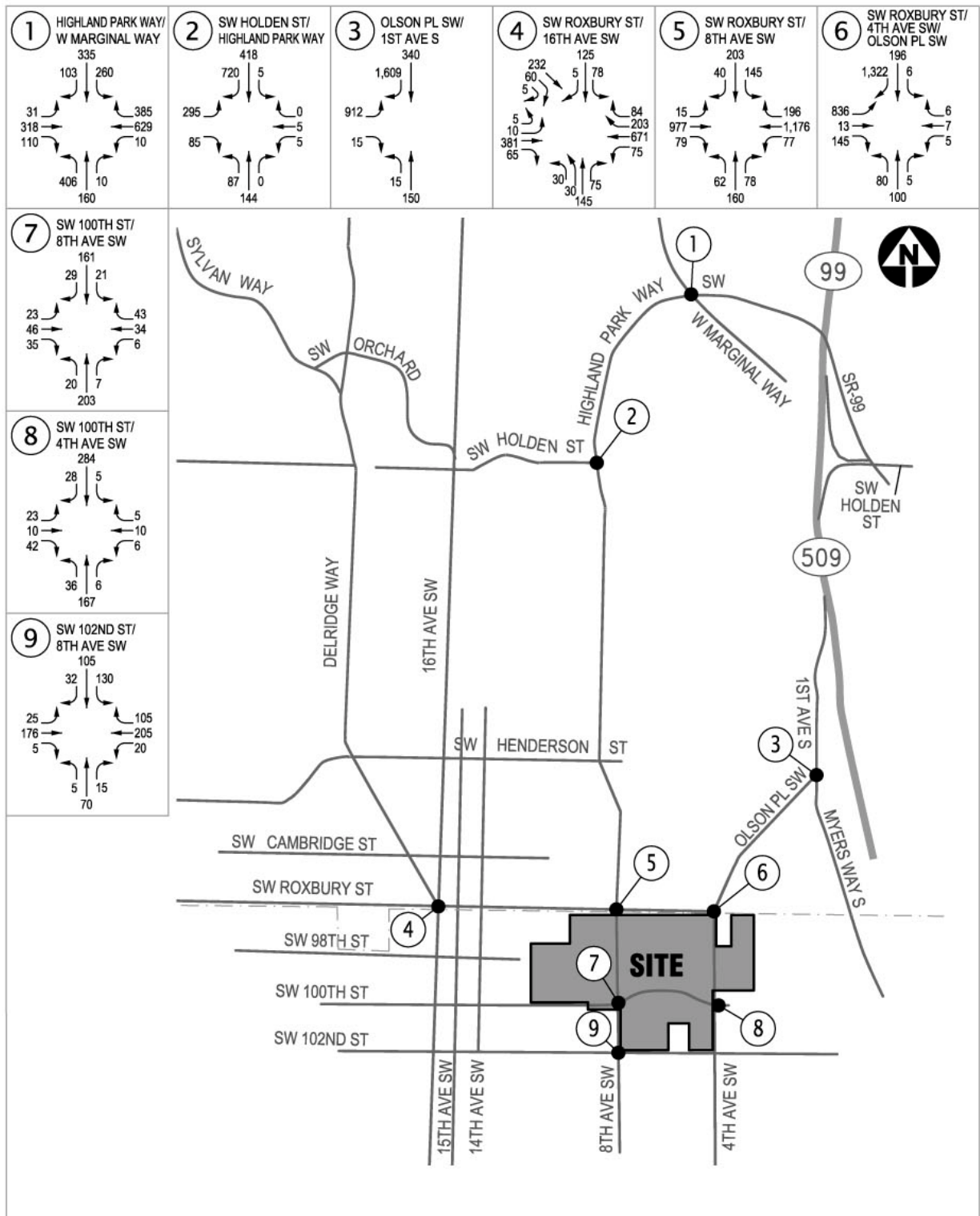
New AM and PM peak hour traffic volumes were added to 2012 Baseline (No Action Alternative) volumes to estimate peak hour volumes. **Figures 4.15-11** and **4.15-12** illustrate traffic volumes (AM and PM peak hour, respectively) at study intersections. By comparing total entering traffic volumes for the 2012 Baseline volumes and the Design Alternative Master Plan, the percent impact of project traffic can be identified at study intersections, as illustrated in **Table 4.15-10**.

Due to the close proximity of 8<sup>th</sup> Avenue SW/SW Roxbury Street, 8<sup>th</sup> Avenue SW/SW 100<sup>th</sup> Street, and 4<sup>th</sup> Avenue SW/SW 100<sup>th</sup> Street to the project site, these intersections would experience the greatest traffic impact during the AM peak hour (7 to 12-percent). Similarly, during the PM peak hour, these three intersections would also experience the greatest traffic impact, as 7 to 12-percent of total entering traffic volumes would be attributable to site-generated traffic. With the exception of 8<sup>th</sup> Avenue SW/SW 100<sup>th</sup> Street and 4<sup>th</sup> Avenue SW/SW 100<sup>th</sup> Street, all intersections would generate an impact of less than 10 percent during both the AM and PM peak hours.





Source: The Transpo Group



Source: The Transpo Group

Figure 4.15-12

Table 4.15-10  
AM AND PM PEAK HOUR TRAFFIC VOLUME IMPACT – DESIGN  
ALTERNATIVE MASTER PLAN

Study Intersections	2012 AM Peak Hour				2012 PM Peak Hour			
	2012 Baseline	Project Traffic	Alternative Action	% Impact	2012 Baseline <sup>1</sup>	Project Traffic	Alternative Action	% Impact
16 <sup>th</sup> Avenue SW/SW Roxbury Street	1,680	69	1,749	3.9%	2,190	89	2,279	3.9%
8 <sup>th</sup> Avenue SW/SW Roxbury Street	2,085	159	2,244	7.1%	2,985	223	3,208	7.0%
Olson PI SW/SW Roxbury Street	2,210	94	2,304	4.1%	2,600	121	2,721	4.4%
1 <sup>st</sup> Avenue S/Olson PI SW	2,585	68	2,653	2.6%	2,955	86	3,041	2.8%
Highland Park Wy SW/W Marginal Way SW	2,690	47	2,737	1.7%	2,695	62	2,757	2.2%
8 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	475	67	542	12.4%	550	78	628	12.4%
4 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	485	48	533	9.0%	560	62	622	10.0%
8 <sup>th</sup> Avenue SW/SW 102 <sup>nd</sup> Street	480	18	498	3.6%	875	18	893	2.0%
Highland Park Wy SW/SW Holden Street	1,535	65	1,600	4.1%	1,680	84	1,764	4.8%

### ***Traffic Operations***

#### **Intersection Level of Service**

Based on Design Alternative Master Plan traffic volumes, AM and PM peak hour levels of service were calculated at study intersections. These calculations used the same intersection variables (channelization, traffic control, signal cycle lengths, etc.) as were used in evaluating the No Action Alternative. For comparison purposes, **Table 4.15-11** illustrates peak hour levels of service, average delays, and v/c ratios for the No Action Alternative and Design Alternative Master Plan.

As shown in Table 4.15-11, no intersection levels of service are expected to degrade in 2012 with the Design Alternative Master Plan. During the PM peak hour, average delay at 8<sup>th</sup> Avenue SW/SW Roxbury Street would increase by approximately nine seconds per vehicle.

At all other study intersections, a slight increase in delay is expected as a result of the addition of project traffic.

#### ***Transportation Concurrency***

As with the Proposed Master Plan Alternative, the zone in which the project site is located is currently "green" on the County's concurrency map. Therefore, it is forecast that the adjacent roadway network can accommodate the additional traffic generated by the proposed project and King County issued a Concurrency Certificate for Greenbridge in August 2003.

Table 4.15-11  
PEAK HOUR LOS SUMMARY-2012 NO ACTION ALTERNATIVE AND  
DESIGN ALTERNATIVE MASTER PLAN

Signalized Intersections <sup>1</sup>	AM Peak Hour						PM Peak Hour					
	No Action (2012)			Design Alternative Master Plan (2012)			No Action (2012)			Design Alternative Master Plan (2012)		
	LOS <sup>2</sup>	Del <sup>3</sup>	V/C <sup>4</sup>	LOS	Del	V/C	LOS	Del	V/C	LOS	Del	V/C
16 <sup>th</sup> Avenue SW/SW Roxbury Street	C	23.8	0.59	C	23.9	0.60	C	29.3	0.78	C	34.1	0.84
8 <sup>th</sup> Avenue SW/SW Roxbury Street	B	16.3	0.69	B	17.6	0.76	B	15.2	0.77	C	24.3	0.94
Olson PI SW/SW Roxbury Street	B	16.5	0.71	B	18.8	0.74	B	11.7	0.47	B	12.8	0.50
1 <sup>st</sup> Avenue S/Olson PI SW	B	11.3	0.66	B	11.8	0.68	E	63.6	1.06	E	73.3	1.10
Highland Park Wy SW/W Marginal Way SW	D	37.9	0.79	D	38.1	0.74	D	35.9	0.89	D	37.3	0.90
Unsignalized Intersections	LOS	Del	WM <sup>6</sup>	LOS	Del	WM	LOS	Del	WM	LOS	Del	WM
8 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	B	12.8	EB App	B	14.0	EB App	B	12.7	EB App	B	14.4	EB App
4 <sup>th</sup> Avenue SW/SW 100 <sup>th</sup> Street	B	12.4	WB App	B	12.9	WB App	B	12.6	WB App	B	13.6	WB App
8 <sup>th</sup> Avenue SW/SW 102 <sup>nd</sup> Street <sup>7</sup>	A	8.6	--	A	9.0	--	B	11.9	--	B	13.0	WB App
Highland Park Wy SW/SW Holden Street	F	114.5	EB Left	F	148.8	EB Left	F	59.1	EB Left	F	100.6	EB Left

Notes:

1. LOS, delays, and v/c ratios at signalized intersections reflect the operation of the intersection as a whole.
2. LOS = Level of Service (A-F)
3. Del = Average control delay measured in seconds per vehicle
4. V/C = Critical volume-to-capacity ratio
5. Delay for unsignalized intersections reflects the delay for the worst movement.
6. WM = Worst Movement. App = Approach EB= Eastbound WB= Westbound
7. All-way stop controlled intersection- delay represents operation of the intersection as a whole

### **Transit**

As with the Proposed Master Plan, it is assumed that existing and future transit service would continue to be used as a means to access the site. Transit stops are incorporated into the design of 8<sup>th</sup> Avenue SW. The design of 100<sup>th</sup> Street also anticipates that future transit service may also utilize this for future routes. However, the improved services planned by King County Metro Transit and Sound Transit are expected to accommodate any increase in ridership that would result. Therefore, these additional trips would not create a significant adverse impact to transit operations in the area.

### **Non-Motorized Facilities**

The Design Alternative Master Plan would provide pedestrian connections throughout the site. The revised roadway alignment and roadway configuration would provide shorter walking distance for crossing the site by providing more direct routing and sidewalk connections. Improved intersection alignments would provide more identifiable roadway intersections and crosswalks, allowing safer crossing for pedestrians at more regular intervals. Proposed traffic calming measures would contribute to slowing vehicular traffic, which will help accommodate non-motorized (pedestrian and bicycle) trips.

Outside of the project site, existing non-motorized facilities within the study area are sufficient to accommodate the Design Alternative Master Plan trip generation that would access the site via pedestrian or bicycle facilities. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur.

### ***Traffic Safety***

There would be a slight increase in the potential for traffic accidents at study intersections proportionate to the increase in traffic due to trip generation. As noted previously, the Design Alternative Master Plan is anticipated to increase peak hour intersection traffic by approximately 2 to 12-percent at the study intersections. As with the Proposed Master Plan, mitigation measures are suggested to improve safety concerns created by existing sight distance inadequacies at the intersection of Roxbury Street and SW 8<sup>th</sup> Avenue (see mitigation section).

### ***Parking***

Approximately 3,000 parking spaces would be provided within the redevelopment area, with just under 30 percent on-street parking. The total parking supply is approximately 500 more than that proposed in the Proposed Master Plan while the total number of units and community facility/commercial space sizes are the same. As such, the proposed supply would be more than adequate to meet the peak parking demand for the proposed redevelopment.

#### 4.15.5 Mitigation Measures

##### Construction

Construction mitigation would be the same as the Proposed Master Plan

##### Operation

### ***Roadway and Intersection Mitigation***

As with the Proposed Master Plan, no study intersections would degrade to LOS of E or lower as a result of the Design Alternative Master Plan. Thus, no level of service related mitigation is anticipated to be necessary. The same modifications are recommended for consideration to improve existing site distance inadequacies at 8<sup>th</sup> Avenue SW/SW Roxbury Street, including the addition of advanced warning of stopped traffic for eastbound vehicles, west of the intersection and restricting northbound right-turns on red. The addition to signal phasing of a protected left-turn phase for westbound to southbound movements may also be considered.

### ***MPS Fees***

Mitigation Payment System Fees would be calculated as described for the Proposed Master Plan Alternative. The fee for market rate housing would be slightly less than for the Proposed Master Plan due to the difference in number and types of market rate housing.

#### 4.15.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to transportation and parking are anticipated.